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UNDULANT AND ABORTUS FEVERS.

CAYREL (A. M.). Faut-il demembrer la fièvre de Malte. [**Undulant Fever: One Disease or More.**]—*Paris Méd.* 1926. Feb. 13. Vol. 16. No. 7. pp. 141–147.

The author gives a critical résumé of recent observations on the unity or duality of undulant fever and epidemic abortion. There are few new facts, but he brings specially to notice the observation that, in Northern Italy, a prolonged fever in man, in an epidemic form, is definitely traced to infection through contact with aborted bovines; cases of VIVIANI, FICAI & ALESSANDRINI and others are cited. He states, however, that abortion may be due to a number of germs, para-typhoid, spirochaetes, etc., and not necessarily to *B. abortus*. "It is undoubtedly true that cattle and pigs are very dangerous for man, especially at the time of abortion, when they are able to transmit an infective bacillus." GABBI, and recently BASTAI & CERRUTTI, have isolated the *M. melitensis* from the milk of cows in contact with goats infected with the germ; this fact [if confirmed] together with the production of abortion in cows by the experimental injection of *M. melitensis* (EVANS) appears to link the caprine and bovine infections. NICOLLE, BURNET & CONSEIL consider the organisms similar except that abortus is not pathogenic to man. The dual theory is strongly supported by Italian authors, especially FICAI & ALESSANDRINI, who have described morphological, cultural, biological and clinical differences; the different thermostability of the two is a most important diagnostic point, the true agglutinins of *M. melitensis* being inactivated at 65° C., those of *B. abortus* at 75°. This, however, is not reliable according to GIUGNI & ROSSI. The clinical differentiation of undulant and abortus fevers set out in a table can hardly be accepted, particularly the statements that in undulant fever the duration is generally short, sweats are not profuse and spleen enlargement is inconstant.

The main contention is, however, made out, that the danger of infection from cattle and pigs is a very real one, but whether this is the same as that from goats is yet uncertain. The subject is now so important and the disease is so widespread and affects so many classes of the community that properly concerted measures are required for its elucidation and prevention.

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[It is curious that in Italy no mention is made of infected ewes which appear to be so important in Southern France. The recent work of Th. Smith showing the histological differences produced in guineapigs by the two organisms is not noticed.]

P. W. Bassett-Smith.

Smith (Theobald). **The Relation of *Bacillus abortus* from Bovine Sources to Malta Fever.**—*Jl. Experim. Med.* 1926. Feb. 1. Vol. 43. No. 2. Pt. 1. pp. 207–223. [26 refs.]

The author states that in experimental work with melitensis and abortus two sources of error have been common, namely, the use of strains that are too old and the utilization of too large doses. Working with new and old strains of the two organisms, subcultured intraperitoneally in guineapigs, and using equal doses he found that recent strains of *M. melitensis* were more virulent than old ones, and the same held good for paramelitensis. He found that the early changes in the spleen and lymph glands of guineapigs inoculated with a human strain of *M. melitensis* were entirely different from those produced by *B. abortus*, but that later, though distinct, the differences were less apparent. An old strain from Zammit was useless for inoculation work. He states that previous published work and his experiments both indicate that the porcine strain of abortus resembles the human strain more than does the bovine. Two cultures, resembling *B. abortus* from cattle isolated from human cases of so-called Malta fever, were shown by their effects in guineapigs to be *not identical* with bovine strains. He comes to the conclusion that the evidence is inadequate to establish that the bovine abortus is able to produce a disease simulating undulant fever in man.

P. W. B-S.

Moore (Veranus A.) & Carpenter (Charles M.). **Undulant Fever in Man associated with Bacteria indistinguishable from *Brucella abortus*.**—*Cornell Vet.* 1926. Apr. Vol. 16. No. 2. pp. 147–152. [29 refs.]

The authors review the recent developments of the work on melitensis and abortus diseases. Bang bacillus was found in 14 per cent. of samples of cows' milk by Schroeder & Cotton, a finding confirmed in many places by others. Later, Larson & Sedgwick found antibodies to the organism in the blood of women who had recently aborted ; they were also demonstrated in the blood of children. Cases of undulant fever have been reported where no evidence of infection from goats was obtainable, and in 1924 Keefer reported a case of undulant fever due to *B. abortus* ; later Korte & Duncan reported other cases. Orpen finds a fever like undulant in Rhodesia due to *B. abortus*, and cases have followed infection from handling animals or parts of animals suffering from epidemic abortion. It is stated that the strains of abortus obtained from man have produced abortion in cattle. Theobald Smith has shown that the variety of abortus found in pigs is more nearly allied to the organism found in man than is the abortus of cattle. It is certain that some strains of the *B. abortus* ingested in milk can produce a fever in man, but further work is being systematically

carried out with regard to " the relationship that appears to exist between the Bang abortus disease and the certain but as yet imperfectly described cases of illness in man."

P. W. B-S.

FAVILLI (Giovanni). Ricerche e considerazioni critiche sulla febbre mediterranea e sull'aborto epizootico. (Epidemiologia della Provincia di Firenze nel 1925.) [**Epidemiology of Undulant Fever and Epizootic Abortion in Florence in 1925.**]—*Sperimentale.* 1926. Vol. 80. No. 1–2. pp. 41–76. [68 refs.]

During 1925 there were 120 notifications in Florence of cases of undulant fever. Fifteen of these appeared to have contracted the disease in the town, the remainder in the neighbouring districts. Many had nothing to do with goats, nor did they drink goats' milk or eat any of its products. Some probably contracted the disease by eating raw vegetables and salads grown on soil contaminated by goats and sheep. Others, again, had been in contact with aborting or recently aborted cows. Lastly, some could be explained only by supposing that a carrier was present. A second section of the paper records the results of tests carried out by the author to confirm or refute the question of previously reported differences between the organisms of undulant fever and contagious abortion. He finds that they are morphologically indistinguishable, and react similarly serologically, or that the differences are too slight to be of any true diagnostic value. The last section is concerned with a general discussion of the subject, whether the two germs are identical, or are closely allied strains derived from a common ancestor, any slight differences being the result of passage through and adaptation to different hosts. The question, as usual, is left unsolved.

H. Harold Scott.

HUDDLESON (I. Forest). **Is** *Bacterium abortus* **Pathogenic for Human Beings ?**—*Jl. Amer. Med. Assoc.* 1926. Mar. 27. Vol. 86. No. 13. pp. 943–944. [10 refs.]

The following interesting cases are reported. (1) A graduate of East Lassing, Mich., while working with some newly isolated cultures of *B. abortus* in the winter of 1924, became ill and continued to have an irregular fever for over 12 months ; no definite diagnosis was made. He then became suspicious of infection, and his blood reacted up to 1 in 50 to both abortus and melitensis. Blood and urine were negative on culture. He had not worked at any time with *M. melitensis.* (2) Also a student in the laboratory, working for one year with bovine strains of *B. abortus.* He had severe fever with relapses, of prolonged duration. His blood, from which *B. abortus* (?) was isolated, agglutinated both organisms up to 1 in 2,000. He had been drinking raw cows' milk which was proved to be infected with *B. abortus.* (3) Again a student working with the cultures ; clinically the type was ambulant. Blood culture and agglutination were positive. The milk used by, the third was the same as that used by the second. In view of the opportunity of laboratory infection, it is impossible to say that the infection was due to the milk.

The technique of FICAI & ALESSANDRINI was used and the results, both by agglutination and anaerobic cultures, pointed to *B. abortus.*

The author says, if these cases were contracted from raw cows' milk, then why not more cases in U.S.A.? The matter is explained thus. (1) It is rare to find the organism in the udders of cows in full milk and when found it is only a light infection, not more than 500 per cc. [*cf.* the heavy infection found in goats]. (2) When the milk is drying up, there are millions per cc.; if this should get into ordinary milk, gross infection takes place and the sample milk becomes dangerous.

P. W. B-S.

Aben-Athar (Jayme). Um caso de infecção para-melitense. [**A Case of Paramelitensis Infection.**]—*Sciencia Medica.* 1926. Jan. 31. Vol. 4. No. 1. pp. 19–27.

A little girl was bitten by a cat, and two days later was seen by the author, Director of the Pára Institute of Hygiene, who at first thought of giving antirabic treatment, but as the cat was apparently quite healthy, he decided to clean the wound and wait. Soon afterwards the child complained of headache and shivering, and was feverish. Two days later symptoms became aggravated with delirium and convulsions, and within a week of the accident the patient became comatose and died.

From the blood of the child and from the animal, which it seems had recently aborted, an organism was isolated which proved by serological reactions to be one of the paramelitensis group. No other source of infection could be discovered. The latter part of the paper is occupied with the usual discussion as to the identity of *M. melitensis* and *B. abortus.*

[The value of this report depends upon the reliability of the bacteriological findings—and from the clinical history of the case the conclusion would appear doubtful.—P. W. B-S.]

H. Harold Scott.

d'Arbela (Felice). Ittero infettivo nel corso di una febbre mediterranea. [**Infective Jaundice in Undulant Fever.**]—*Riv. di Clin. Med.* 1926. Mar. 30. Vol. 27. No. 6. pp. 201–216. With 1 chart in text. [29 refs.]

This case is reported and discussed in minute detail. The disease began with jaundice, and this is ascribed to hepatic localization of the *M. melitensis.* The diagnosis of undulant fever was arrived at because the patient's serum agglutinated the organism in a titre of 1 : 800. Blood-culture, however, was negative and the temperature chart, which is given, bears no resemblance at all to that of this disease. The nature of the jaundice was determined by exclusion. The connexion between the two conditions is not altogether convincing. [May we offer a remonstrance against the growing habit of authors abroad of swelling reports with irrelevant detail? For example, the facts that the father of the above patient was aged 61 and had a double hernia, while the mother was 51 and suffered from varicose veins, have no bearing on infective jaundice or undulant fever in their offspring.]

H. Harold Scott.

Desage, Pellerin & Vinerta. Un cas de méningite à mélitensis. Contribution à l'étude de la méningite de la fièvre de Malte. [**A Case of Melitensis Meningitis.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. June 3. 3rd Ser. Year 42. Vol. 50. No. 19. pp. 872–879. With 2 text figs.

Cases of melitensis meningitis are uncommon, but in those which have been described the occurrence of an increase in the mononuclear cells and sugar content is said to be distinctive. In the case reported, a girl of 18, there was a *decrease* in the sugar, but a marked mono-

nuclear increase (Polynuc. 12 per cent., Large mononuc. 12 per cent., Small mononc. 7 per cent., Lymph. 68 per cent., Trans. 1 per cent.). The diagnosis therefore from chronic tuberculous meningitis was difficult. In this case the meningitic symptoms appeared in the fourth month after a long fever of undulant character ; two serum tests gave negative agglutination reactions, but a variety of the *M. melitensis* was isolated from the cerebrospinal fluid, the only biological character which differentiated it from tuberculosis.

The authors conclude that the infecting organism is able at the terminal stages of undulant fever to localize itself in the meninges and cause a masked form of meningitis, without fever ; the characteristic signs being severe headache, diplopia and tachycardia.

The patient was treated with autovaccines and by radiotherapy and a complete cure resulted.

P. W. B-S.

Dargein. Mélitococcie (étude clinique des cas observés depuis 1920 à l'hôpital Sainte-Anne). [**Undulant Fever. Clinical Study of Cases seen since 1920.**]—*Arch. Méd. et Pharm. Nav.* 1926. Apr.-May-June. Vol. 116. No. 2. pp. 89–111.

The author states that before 1912 cases of undulant fever were very rare in the hospital, but that in 1920 they became frequent and have been ever since. In one case he was able to fix 8 days as the incubation period. Among the symptoms, special attention is drawn to the severe headache, and one case with haemoptysis is recorded. The duration was 5 to 6 months, never as long as a year. There were many masked forms (fruste) which caused confusion in diagnosis. Indirect contagion through food was most common, but in many cases infection was undoubtedly direct. The author states that there was no case in which infection from cows' milk could be clearly proved. He does not consider that any specific treatment has been found. [This is an interesting description of the disease and worth reading, but it does not contain anything new.]

P. W. B-S.

Sergent (Emile), Mignot (René) & Kourilsky (Raoul). A propos d'un cas de fièvre de Malte. [**A Case of Undulant Fever.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. Feb. 11. Year 42. 3rd Ser. Vol. 50. No. 5. pp. 197–201.

The authors describe in detail a case of undulant fever in a native of Damascus in which the clinical signs and symptoms were indefinite. The diagnosis was made by blood culture and serum tests, and the good results of vaccine therapy were well shown ; the intradermal method was not tried. The disease was probably due to infection acquired in Corsica. The importance of laboratory tests is shown and also that a single negative is never conclusive. It was only at the sixth blood culture that the micrococcus was grown and the agglutination titre was not above 1/200.

P. W. B-S.

Acken (Henry S.). **A Case of Malta Fever.**—*Jl. Amer. Med. Assoc.* 1926. May 29. Vol. 86. No. 22. p. 1687.

The case reported is that of a minister, aged 37, in New York State. The fever ran a very long course with three definite pyrexial periods. At first it was thought to be typhoid, but all serum reactions were negative,

and after admission to hospital no diagnosis was made. On readmission, a month later, undulant fever was suspected but blood cultures were negative; the serum, however, gave an agglutinative titre of 1 in 800 to *M. melitensis* and *B. abortus*. During the pyrexial periods there were few symptoms and the spleen was not palpable. There was a definite lymphocytosis. Recovery was spontaneous without any specific treatment.

P. W. B-S.

Greval (S. D. S.) & Row (C. K.). **A Case of Undulant Fever in Aden.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 525–529. With 2 text figs.

This is the first case recorded from Aden. The man was a sepoy. The fever was typical with arthritis and constipation. The blood agglutinated to 1 in 100. No blood culture was made. Convalescence under vaccine treatment was rapid. It is suggested that the disease was derived from goats slaughtered at Perim.

P. W. B-S.

Weyrauch (F.). Ein Fall von Maltafieber in Jena. [**A Case of Undulant Fever in Jena.**]—*Muench. Med. Woch.* 1926. Feb. 19. Vol. 73. No. 8. pp. 321–322.

In 1914 Mühlens drew attention to cases of undulant fever invalided to Germany from German South West Africa, but no cases endemic in Germany were found. In the case described, the patient contracted the fever while visiting the Riviera, and the cause is said to have been unboiled goats' milk. The blood showed a high agglutinating power, up to 1 in 16,000.

P. W. B-S.

Mgebrow (M. L.). [**Malta Fever in Azerbaidjan and its Clinical Aspects.**]—*Russian Jl. Trop. Med.* Moscow. 1925. No. 4–5–6. [In Russian: pp. 29–45. With 4 charts in text. 8 refs.]

The occurence of undulant fever in Russia was recognized for the first time in 1922, when cases were found in Turkestan and in the Caucasus (Azerbaidjan). The author describes eight more cases from the latter region observed between 1922 and 1924.

C. A. Hoare.

Tinti (Mario). Sulla eziopatogenesi di una porpora emorragica fulminante [tipo Werlhof] nel decorso di una febbre mediterranea. [**The Pathogeny of Purpura Haemorrhagica in Undulant Fever.**]—*Riv. di Clin. Med.* 1925. Dec. 30. Vol. 26. No. 24. pp. 841–861. [29 refs.]

A man of 66 years suffered from an attack of undulant fever. On the tenth day of disease purpura made its appearance with haematuria and extensive cutaneous haemorrhages. The question of the pathogenesis of the purpuric condition is discussed. The possibility of the causative organism being of special virulence, or of its becoming relatively so by reason of some auxiliary defect on the part of the patient, and the presence of other conditions, such as tuberculosis or hepatic mischief, are all considered. The reasoning is not altogether convincing. The patient married, as his second wife, a woman who died of tuberculosis, and a daughter suffered from exudative pleurisy with long convalescence; these facts constitute somewhat slender evidence on which to postulate the disease in the patient. The fact that tuberculosis of the adrenals may lead to purpura is mentioned with some prominence, but in the case of this patient no autopsy was held to confirm the presence of tuberculosis anywhere. Secondly, hepatic mischief, the result possibly of gall-stones, is suggested as aiding the accumulation of toxic substances and so assisting in bringing about the purpuric state. The liver was a little enlarged, but there was no

jaundice or other indication of hepatic inadequacy, nor any proof of the existence of biliary calculi. To ascribe infective purpura to a "diathetic constitutional element by which an acquired infection takes on a purpuric character," as stated in the author's summary, does not carry the investigation very far.

H. Harold Scott.

ORCUTT (Marion L.). **Agglutination Affinities of the *Abortus-Melitensis* Group of Bacteria with Special Reference to Two Human Strains.**—*Jl. Experim. Med.* 1926. Feb. 1. Vol. 43. No. 2. Pt. 1. pp. 225–232. [14 refs.]

These experiments refer to the strains used by Th. SMITH. The conclusions are; "While there appears to be evidence of serological distinctions between *B. abortus* and *B. melitensis* cultures as studied by early workers, the experiments reported in this paper show no serological distinctions among the six strains used. *B. melitensis* 2 and *B. melitensis* 3 were found to be identical with the bovine and swine strains by means of agglutination and agglutinin absorption reactions in unheated sera, by agglutination in heated sera, and with the use of heated cultures in unheated and heated sera."

P. W. B-S.

TRENTINI (Silvio). Sull' agglutinazione con l'acido lattico come mezzo di differenziazione del *M. melitensis* dal *B. abortus* (Bang). [**Agglutination by Lactic Acid as a Means of Differentiating between *M. melitensis* and *B. abortus* (Bang).**]—*Pathologica.* 1926. June 15. Vol. 18. No. 416. pp. 309–310. [3 refs.]

The author has repeated the experiments of VERCELLANA and ZANZUCCHI with respect to the non-specific agglutination of *M. melitensis* with 1 per cent. lactic acid, and the failure of *B. abortus* to react in the same way. He worked with six strains of the former and eight of the latter.

Four strains of *B. abortus* failed to agglutinate; the other four gave a definite but incomplete agglutination. Two strains of *M. melitensis* gave complete agglutination, the other four partial only.

The question whether, in the passage of *M. melitensis* through bovines and of *B. abortus* through man, the respective organisms become in some way altered or modified in their reactions is yet to be determined.

H. Harold Scott.

VERCELLANA (G.) & ZANZUCCHI (A.). La differenziazione del M. melitense dal B. di Bang mediante un saggio di agglutinazione aspecifica. [**The Differentiation of *M. melitensis* from *B. abortus* by Non-Specific Agglutination.**]—*Pathologica.* 1926. May 15. Vol. 18. No. 415. pp. 247–252. With 1 text fig.

On the suggestion of Professor SANGIORGI the authors carried out tests to determine whether any valid difference between these organisms could be discovered by non-specific agglutination.

Tests were set up by mixing 1 cc. of bacterial emulsion in distilled water with an equal volume of each of the following: Commercial formalin, corrosive sublimate (1 : 1000), alcohol (95 per cent.), caustic soda, lactic acid, acetic acid, butyric acid, and hydrochloric acid, each in 1 per cent. dilution. After remaining for 30 minutes at 37° C. there

was marked agglutination of *M. melitensis* with 1 per cent. lactic acid, and with 0·2 per cent. in 24 hours, whereas Bang's bacillus proved quite negative.

The tests were repeated with eight strains of each organism and, provided that the culture was a fresh one, it was found that *M. melitensis* in six of its strains gave a strong agglutinating reaction, and in the remaining two a weak one, whereas *B. abortus* gave in one instance only a very slight agglutination, namely 1 : 20 in 24 hours.

H. H. S.

Izar (Guido). Sui fattori determinanti le variazioni di agglutinabilita del micrococco di Bruce. [**Factors determining Variations in Agglutinability of** *M. melitensis.*]—*Riforma Med.* 1926. May 10. Vol. 42. No. 19. p. 433.

The author finds that if a certain strain of *M. melitensis* be grown on simple nutrient agar, and on glycerin glucose agar, and the agglutination reactions be carried out with various sera, after ten or so subcultivations the two show considerable differences. That on agar maintains its morphological, biological and cultural characters and its agglutinability with immune sera or that of undulant fever patients. On the other hand, the culture on the richer medium undergoes changes morphologically to large cocci, which may be in chains, and become more readily agglutinable with normal as well as pathological sera, even in dilutions as high as 1 : 300–1 : 600. After a large number, a hundred or more, of passages on ordinary agar the agglutinating serum needs to be much stronger. Transfer to a richer medium for a few passages restores the original agglutinability, which is then retained for a long time when subcultivated on the simple agar. These facts may afford an explanation of the apparently paradoxical results which have been reported by different writers dealing with a strain grown on different media.

H. H. S.

Iacono (L.). [Agglutinine anti-Bang e agglutinine anti-Bruce.] [**Anti-abortus and Anti-melitensis Agglutinins.**]—*Riv. di Patologia Sperim.* 1926. Jan.–Feb. Vol. 1. No. 1. pp. 11–24. [22 refs.] [Summarized in *Bull. Inst. Pasteur.* 1926. Apr. 30. Vol. 24. No. 8. p. 347.]

Experiments were carried out to test the differential agglutinative characters of *M. melitensis* and *B. abortus* as recommended by Ficai & Alessandrini. The author states that although great care was taken the test failed to distinguish between the two.

P. W. B-S.

Kravetz (D. A.). Zur Frage ueber Heterogene Aglütinations Reaction bei *Febris melitensis.* [**Heterologous Agglutination in Undulant Fever.**]—*Jl. Méd. de l'Asie Centrale.* Tashkent. 1926. Vol. 5. No. 4. German summary p. 241. [In Russian pp. 210–214.]

The serum of a dog which had been inoculated with a strain of *M. melitensis* and agglutinated the specific organism to 1 in 10,000 agglutinated also 11 out of 14 strains of *Staphylococcus aureus* and *albus* in dilutions of 1 in 50 to 1 in 2,000.

P. W. B-S.

Béguet (M.). Les caractères differentiels des souches dans le genre *Brucella* et les essais de classification. [**The Differential Characters of *Brucella* Strains : their Classification.**]—*C.R. Soc. Biol.* 1926. May 14. Vol. 94. No. 16. pp. 1187–1189. [1 ref.]

The author states that he has investigated 42 strains of Brucella (*M. melitensis, M. paramelitensis* from goats, and *B. abortus* from cows). to determine whether the methods of Bassett-Smith, Burnet, Meyer, Evans and others are of differential value. Morphological and cultural characters, non-specific agglutinability, tendency to agglutinate spontaneously, agglutinogenic power and flocculation at 90° C. are not reliable characters for separation of species. He states that classification by absorption of agglutinins gives no more certainty than that by the simple agglutinations, for the specific agglutinins vary as much in themselves as the non-specific. He never found spontaneous agglutination in 24 hour cultures when the saline emulsion was fresh. The parallelism between the flocculation of Burnet and the agglutination by non-specific sera was found to be of real value in the choice of strains for serum tests and for vaccines, but flocculation is a purely individual and not a specific character. At the present time he considers that we are unable to differentiate the various groups of the genus *Brucella*, but he makes no reference to pathological changes or to toxicity, nor has he noted recent work by Duncan and others.

[As a generic term the name " Brucella " is likely to be retained.]

P. W. B-S.

Burnet (Et.). Observations sur des chèvres infectées de *M. melitensis* (infection expérimentale). [**Experimental Melitensis Infections in Goats.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 132–144.

The author has made a fresh series of experiments upon goats, and puts forward the following conclusions:

1. The goat can be heavily infected with *M. melitensis* without showing any deviation from health.

2. The goat can be infected by various methods without interference with breeding, but goats infected near their term may abort.

3. A febrile reaction is produced by reinfection, but not regularly.

4. From the injected goats the author has never obtained a positive blood culture.

5. After ingestion of living and virulent *M. melitensis* the agglutination of the blood may be nil ; after injection into the mammary gland it rises gradually, then falls and tends to disappear ; high titres are given by subcutaneous and intravenous injections.

6. Goats inoculated in the mammary gland or teats do not necessarily go dry; the microbes disappear from the milk in some weeks ; the milk may show leucocytes, indicating a mastitis and often a staphylococcic infection.

7. In goats infected by repeated and large doses he can never find macroscopic lesions, but in one case there was gland caseation with sterile pus or only staphylococci ; in only one case did he find any melitensis colonies. It is possible that microbic centres exist which undergo spontaneous bacteriological cure. These paradoxical results suggest that there exist differences between natural and experimental infections.

P. W. B-S.

Burnet (Et.). Sur la resistance au *M. melitensis* de chevreaux nés de chèvres infectées et nourris de lait infecté. [**Resistance to *M. melitensis* of Kids of Infected Goats reared on Infected Milk.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 145–160.

Has the kid borne of an infected mother an immunity or at least a resistance against melitensis infection? This question is very important, and was first raised by Zammit in 1908, after the observation of 15 animals. It was answered more or less in the affirmative by him, and the facts on which his deductions were based are given. The author has made fresh observations with 5 animals; he states that though there is great difficulty in making a certain diagnosis of the absence of infection in the goat, yet the observations show that though the immunity (or resistance) is not certain, it is probable and may be of very practical value; and this points to the importance of early vaccination of the kids for prevention of the disease before the mammary glands develop, and thus avoiding infection of the milk.

P. W. B-S.

Lancelin, Seguy & Dubreuil. A propos de l'utilisation possible de la bile comme milieu d'enrichissement du mélitocoque. [**The Possible Utilization of Bile as Enrichment Medium for Melitensis.**]—*C.R. Soc. Biol.* 1926. Mar. 5. Vol. 94. No. 8. pp. 518–519.

The author points out that though for a negative culture test with "bile peptone glucose" 48 hours is sufficient to eliminate T. A. & B., it is not so for other forms of septicaemia, particularly that of *M. melitensis*. If after 30 hours the apparently unchanged medium is planted out on to agar, distinct colonies are frequently found, the first medium acting as an enrichment medium. Technique: For the subculture the material is taken from the very bottom of the tube, 2–3 cc. are transferred to the agar tube, which is allowed to lie flat for 2–3 hours and then placed vertically; a positive result may be obtained in 50 hours.

[As a routine, blood cultures for melitensis taken by the reviewer have been subcultured every 24 hours, but the dew-like colonies rarely appear before the third or fourth day. A positive bacteriological diagnosis could not be made in 50 hours, and it is difficult to understand how the author could *definitely* make such a diagnosis.]

P. W. B-S.

Wilson (G. S.) & Nutt (Muriel M.). **The Occurrence of *Brucella abortus* and *Mycobacterium tuberculosis* in Cows' Milk.**—*Jl. Path. & Bact.* 1926. Apr. Vol. 29. No. 2. pp. 141–148. [18 refs.]

The results produced in guineapigs inoculated for evidence of tuberculous infection have been carefully followed up and analysed to determine the amount of *B. abortus* infection of the milk; and whether in tuberculized animals the abortus infection was more common and severe. The authors found that of 488 samples of cows' milk, 68 contained acid-fast bacilli which could not be cultivated saprophytically, and were presumably tubercle. All the guineapigs were killed three weeks after inoculation. Non-tuberculous lesions were often found, and from 11 out of 35 of these, *B. abortus* was cultivated and described as a

small non-motile, non-gram and non-acid-fast bacillus. There was no definite evidence that the combined infection of *B. tuberculosis* and *B. abortus* was more than casual, both thriving independently in the same body. About 5·7 per cent. of the single milks tested from different herds in Cheshire, Lancashire, Derbyshire, Staffordshire and Cumberland were infected with *B. abortus* (in America, COTTON has found the proportion as high as 13 per cent.), but the degree of infection is not stated, an important point as shown by HUDDLESON (*ante*, p. 725).

It seems remarkable that with such a high degree of infection, human abortus fevers are not more frequently found; the frequency is against the unity of the organism with *M. melitensis*, but the sterilization of all milks becomes more imperative.

P. W. B-S.

DENGUE AND PAPPATACI FEVERS.

SILER (J. F.), HALL (M. W.) & HITCHENS (A. P.). **Transmission of Dengue Fever by the Mosquito.**—*Milit. Surgeon.* 1926. Jan. Vol. 58. No. 1. pp. 57–60.

The results of the valuable research work carried out by the authors were described in this *Bulletin*, Vol. 22, p. 943. The later report shows that experiments were made on 64 volunteer American soldiers. There were 111 biting experiments with infected female *Aëdes egypti*, of which 47 were successful. Among the 64 soldiers dengue was produced by experimental means in 52, that is in 81 per cent. All the attempts to transfer the infection by *C. quinquefasciatus* (*C. fatigans*) failed. The virus is present in the blood of the patient shortly before the onset of the fever and may be absent on the third day. The Aëdes is not infective until the eleventh day, and remains so throughout its life. For breeding the larvae, tap water containing slices of ripe banana was found to give better results than the blood serum media at first recommended.

P. W. Bassett-Smith.

TOMB (J. W.). **Colchicum in the Treatment of the After Pains of Dengue Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Feb. 18. Vol. 19. No. 8. pp. 492–493.

The author describes a case of dengue in Bengal in which the subsequent protracted and severe rheumatic pains were unaffected by ordinary treatment. These pains came on some four weeks after the acute fever had passed off. They affected almost all parts of the body and limbs and were always most severe at night. Vinum colchici in 15 minim doses t.d.s. gave immediate relief. Though colchicum does not appear to check the progress of the disease, it affords prompt and great relief from the pain and immobility which are the most prominent and distressing features.

P. W. B-S.

TRABAUD (J. P. R.). La dengue et les fausses dengues. [**Dengue and Pseudo-Dengue.**]—*Arch. Méd. et Pharm. Milit.* 1926. Jan. Vol. 84. No. 1. pp. 39–50. [12 refs.]

The author has previously described three-day fever ; he now takes up the task of differentiating what he calls true dengue from false dengue (pseudodengue). The former is apparently what was described as Mediterranean dengue during the war, simulating rather closely phlebotomus fever ; the latter that type of dengue so commonly found in the middle and far East, having a saddle back temperature curve, and described as seven-day fever by ROGERS. He states, however, that in false dengue, as distinguished from true dengue, death is frequent and complications dangerous and severe. With regard to the etiology he thinks Mediterranean dengue may be a spirillosis, which three-day fever is not, since it is found to spread so rapidly, and occurs at high altitudes where a mosquito host is very doubtful. He describes the short seasonal fevers thus. (1) Endemic in India and Cochin China, spread

by Culex. (2) West Indies and America, spread by Stegomyia. (3) Mediterranean forms, spread by Phlebotomus. (4) World wide, Paludism, spread by Anopheles.

[Most authors would place his true dengue with Phlebotomus fever, and regard false dengue as dengue simplex.]

P. W. B-S.

Young (T. C. McCombie), Richmond (A. R.) & Brendish (G. R.). **Sandflies and Sandfly Fever in the Peshawar District.**—*Indian Jl. Med. Res.* 1926. Apr. Vol. 13. No. 4. pp. 961–1021. With 9 charts, 1 text fig. and 13 figs. on 5 plates. [23 refs.]

This is a long record of a most admirable investigation by a Commission on the sandflies and the fever caused by them in the Peshawar District. The enquiry was chiefly concentrated on determining the character of the breeding grounds, following up the work done by Whitingham and others. The work was commenced in April, 1925, and was limited to the Peshawar cantonments and Landikotal in the Khyber Pass. The chief epidemiological facts noted were; (1) the greater incidence of fever among the non-immune British who stay in Landikotal generally one year only; (2) the lesser incidence among the Gurkha troops, among whom some were probably immune; (3) a much lower incidence among other Indian troops, who had perhaps some acquired or racial immunity. There was a direct relationship between the rainfall and the fever; if the heat was too severe, the breeding places became dried up. It was found that the character of the egg follicles and contained ova gave some useful evidence of the age of the fly and the distance of the breeding place.

The authors do not agree with Wenyon, who says that the fly feeds every second day; they found that it takes one feed only in the first 36 hours, remains in the house for 60–84 hours, then goes to its breeding ground to lay eggs within 108 hours. These breeding grounds are found with difficulty, by recovering the larvae from débris and soil by washing and flotation methods.

They found that the following method gave a prolific breeding medium for experimental purposes—an earthenware pot filled with a mixture of organic matter and soil covered with a layer of clay in which cracks had formed by drying, and surrounded with water to keep the contents damp, introduced into a muslin cage in which sandflies are confined.

At Landikotal the breeding grounds are in the depths of slightly moist organic matter, lying in hollows on broken ground in nullahs. There must always be cracks or crevices, by which the sandflies can gain access to the shelter with darkness, moisture and organic matter which are required for the breeding. These are found generally about 80 yards from dwellings. They conclude that they were dealing with a distinct disease, not a modified dengue, causing a three or four day fever with bradycardia. These cases occur in large numbers in special periods of the year. Clinically the cases vary very much; a small proportion only can be described as coming under the typical text book category. *P. pappataci* was the chief, if not the only carrier. An ectoparasitic mite is described affecting the flies.

For prevention the important points are to find and remove all breeding grounds.

P. W. B-S.

SCHAPIRA (L.). Zur Endemie des Pappatacifiebers in Haifa. [**Pappataci Fever in Haifa.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. May 1. Vol. 30. No. 5. pp. 196–205. With 1 chart in text. [8 refs.]

At the port of Haifa in Palestine, where there is a constant flow of migrants, epidemics of pappataci fever occur every summer. The disease rarely affects the natives, who appear to have a large degree of immunity. The number of cases varies with the number of migrants, almost all of whom contract the disease in the first year. The author gives a curve of incidence which shows peaks in June and August; this he explains by two broods of sandflies, each when mature carrying infection. The epidemiology thus agrees with the biology of the sandflies. He also notes that altitudes of 1,200 feet are as much infected as Haifa itself. Clinically the cases vary much, an urticarial eruption called "Harara" is not uncommon, and severe haemorrhagic types are seen. The general symptoms are detailed, but do not call for special comment.

P. W. B-S.

CARLO-NOBOA (J. M.). 'Etiologia del Dengue (Spanisch).] [**Etiology of Dengue.**]—*An. de la Soc. Méd.-Quirurg. d. Guayas.* Guayaquil. 1924. Vol. 4. No. 7. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Feb. 1. Vol. 30. No. 2. p. 96.]

Dengue is present in Ecuador. Spirochaetes were demonstrated by dark ground illumination and Levaditi's stain in the serum, citrated blood, cerebro-spinal fluid and organs. They were 2–7 μ long, are considered to be the agents of dengue, and are called Leptospira asthenogen. Pfeiffer's reaction with the cultured organism is positive, and the patients' serum agglutinated this also. The leptospira is immunologically distinct from the *L. icterohaemorrhagiae.*

P. W. B-S.

ROCKY MOUNTAIN FEVER.

NOGUCHI (Hideyo). **Cultivation of *Rickettsia*-like Microorganisms from the Rocky Mountain Spotted Fever Tick,** *Dermacentor andersoni.*—*Jl. Experim. Med.* 1926. Apr. 1. Vol. 43. No. 4. pp. 515–532. With 41 figs. on 4 plates. [12 refs.]

A systematic study of 74 ticks showed the presence in some instances of several types of organisms morphologically resembling the mature micro-organisms of spotted fever. The most frequently isolated were *Bacillus rickettsiformis* n. sp., less common *B. pseudoxerosis* n. sp. and *B. equidistans* n. sp. These organisms are non-pathogenic to guinea-pigs, rabbits and *Macacus rhesus*. Morphologically they resemble the forms found in smears and sections of the ticks, yet their presence had no relation to infectivity. Immunologically they are not related to the spotted fever virus. All these are pleomorphic under cultural conditions, and the question arises whether or not the minute non-pathogenic rickettsia forms and the somewhat coarse symbionts found in Dermacentor are morphologically variations due to differences in nutrition, oxygen tension, tissue reactions, etc., in the various tissues and cells in which the organisms are embedded. At all events, the differentia-

tion of the non-pathogenic bodies from the pathogenic *Dermacentor rickettsia* is extremely difficult.

It is important to note that these non-pathogenic micro-organisms of ticks grow best at room temperature, resembling thus certain flagellates found in the alimentary tract of insects. There is always great difficulty in starting growth on artificial media (three special forms of which are described), after which gradual adaptation to less specialized media takes place. Possibly *B. rickettsiformis* is a non-pathogenic phase of the spotted fever organism, but this is very unlikely as it has no immunological characters.

P. W. Bassett-Smith.

Parker (R. R.) & Spencer (R. R.). **Rocky Mountain Spotted Fever. A Study of the Relationship between the Presence of Rickettsia-like Organisms in Tick Smears and the Infectiveness of the Same Ticks.**—*Public Health Rep.* 1926. Mar. 12. Vol. 41. No. 11. pp. 461–469. [2 refs.]

In continuation of researches on the etiology of Rocky Mountain fever a large number of infected and non-infected ticks (*Dermacentor andersoni*) both wild and specially reared were examined, and it was found that although a large percentage of infected ticks contained Rickettsia which were virulent, yet a few others with similar organisms were non-infective; also in some known to be infective no Rickettsia could be demonstrated. The same conditions were found with wild ticks from known infected areas. A small proportion of wild ticks from supposed non infected places were found to contain similar organisms. It is probable that there may be an avirulent phase especially in hibernating forms, which become "reactivated" after the tick has been fed.

P. W. B-S.

Breinl (F.). Untersuchungen ueber die Immunität bei Rocky Mountains Spotted Fever. [**Researches in Immunity in Rocky Mountain Fever.** *Ztschr. f. Immunitätsf. u. Experim. Therap.* 1926. Feb. 5. Vol. 46. No. 2. pp. 123–136. With 9 charts in text. [4 refs.]

The author used 77 guineapigs in groups of 4 or 5 in the experiments and the results are shown in 9 diagrams. The conclusions drawn are the following:—

1. Guineapigs may be rendered immune against Rocky Mountain fever by injecting simultaneously in various parts immune serum and living virus.

2. There are no symptoms during the process of immunization if the serum and virus are given in suitable proportions.

3. Immunity is thus obtained through the survival of the virus in the spleen.

4. If there is too little virus it is quickly destroyed without producing immunity. If there is too much, symptoms are produced in spite of the serum.

5. The virus binds the antibody in vitro. The sensitized virus is either killed in the organism or fever is produced after a long time.

6. Heating the immunizing serum for 45 min. at 60° C. reduces its power considerably.

7. Antibodies in any considerable quantity are found only after a previous attack of fever. Active immunity does not depend upon the antibody content of the blood.

P. W. B-S.

OROYA FEVER.

Noguchi (Hideyo) & Battistini (Telémaco S.). **Etiology of Oroya Fever. I. Cultivation of** *Bartonella bacilliformis.*—*Jl. Experim. Med.* 1926. June 1. Vol. 43. No. 6. pp. 851–864. With 4 charts in text and 17 figs. on 3 plates. [7 refs.]

Working on the same lines as with Leptospira and Leishmania the authors were able to isolate and cultivate the *Bartonella bacilliformis* from the blood of a case of Peruvian "Oroya fever," the blood being sent in cold storage from Lima to New York. The culture was maintained in the laboratory, growing best at low temperature on semi-solid or blood agar media. The organism is an obligate aerobe, gram negative, at times motile; beside the ordinary bacillary forms granular and coarsely irregular elements are met with. The inoculation experiments were successful only in Rhesus monkeys. Intravenous injections of cultures into young animals produce a long irregular fever of remittent type from which for many weeks the organism can be cultivated from the blood, being found in the red cells as in man. Intradermal injections into the eyebrow of young macaques gave rise to nodular forms, rich in blood vessels showing the bacillary organism in the endothelial cells; from these nodules the organism is readily recovered. Excellent plates show the morphology of the organism, some with giant involution forms, blood films, tissue cells, etc., and two coloured plates show the nodules on the face of *Macacus rhesus**. It is noted that all filtration experiments were negative.

P. W. Bassett-Smith.

UNCLASSED FEVERS.

Medical and Scientific Archives of the Adelaide Hospital. No. 4. (Supplement to the Ann. Rep. of the Adelaide Hospital for 1924.). pp. 10–16.—**Further Cases resembling Endemic Typhus Fever (Brill's Disease).**

The clinical characters of 8 cases of the condition are described from the period January to July, 1924. There was one death due to disease of the coronary artery. The laboratory report states that good Weil-Felix reactions were obtained in all, but as a 1/40 titre was found to be not absolutely reliable an agglutination above this was required for a positive result. It is stated that all bloods sent for Widal tests were put up for the former test as a routine and that 93 so done were negative.

P. W. Bassett-Smith.

*The coloured plate of nodules on the brow of *M. rhesus* developing after the injection of cultures resembles closely the plate given by Strong and others of "verruga inoculata in the monkey." Clearly the view expressed by that Expedition on the relations between Oroya fever and verruga peruana will have to be reconsidered. [See this *Bulletin*, Vol. 7, p. 70.]—Ed.

Wheatland (F. T.). **A Fever resembling a Mild Form of Typhus Fever.**—*Med. Jl. Australia.* 1926. Mar. 6. 13th Year. Vol. 1. No. 10. pp. 261–266. [12 refs.]

It is stated that in the Toowoomba and St. Vincent hospitals there were, in 1925, as many as 38 cases of a 12–14 day fever, which were very similar to those described by Hone in Adelaide. The rose-red macular rash appeared on the 5th to 7th day. 36 Weil-Felix tests were made, and all were positive. The mortality was very low. The disease could not be traced to lice, and it was not contagious. Guinea-pig inoculations were all negative. It is stated that mice on the farms in the district where the fever cases came from were found dying off in large numbers. The disease locally was known as "Mouse fever."

P. W. B-S.

Holmes (M. J.) & Richardson (A.). **An Outbreak of Typhus-like Disease on a Sailing Vessel.**—*Health.* Melbourne. 1926. Jan. Vol. 4. No. 1. pp. 20–27. With 2 charts in text. [2 refs.]

The authors report a small epidemic of fever with a rash, in a sailing ship, affecting 6 men out of a crew of 24. The first case occurred 38 days after leaving Tristan da Cunha, the only place called at after leaving New Brunswick 112 days before. There was no disease on the island; some of the natives came on board for one hour, and brought a sheep, some geese and chickens. In 4 of the cases the disease lasted from 5 to 8 days, and these were all well on the arrival of the ship at Melbourne. Two were seriously ill and one died in hospital; both had a macular rash, broncho-pneumonia and prolonged fever of about 30 days. The onset, course, symptoms and signs very strongly suggested a "typhus-like fever". The serum of those tested gave no reaction for enteric group, but the Weil-Felix test was positive. No etiological cause could be traced by the M.O.H. of Melbourne, but bed bugs were present throughout the voyage.

[No reference is made to sheep ticks, which might possibly have been brought on board and have been carriers of a germ for which the residents had acquired immunity.]

P. W. B-S.

Mattlet (G.). Deux cas de fièvre diagnostiqués septicémies après hémoculture. [**Two Cases of Fever diagnosed Septicaemic after Blood Culture.**] *Ann. Soc. Belge de Méd. Trop.* 1926. Jan. Vol. 5. No. 2. pp. 137–140.

Referring to the tendency to relate all cases of fever in the tropics to tropical causes the author describes two cases of fever, more or less prolonged, from which blood cultures demonstrated: (1) a gram-positive diplococcus morphologically like *D. crassus*, not pathogenic to rats; this agglutinated with the patient's serum up to 1/300 but not with normal serum. It is commonly isolated from the pus in meningitis. (2) A short non-haemolytic streptococcus which injected into rabbits gave rise to a transient erysipelas. This case was successfully treated with intravenous injections of electrargol.

P. W. B-S.

Row (Y. S.). **A Case of Fever due to the** *Bacillus faecalis alkaligenes.*—*Indian Med. Gaz.* 1926. June. Vol. 61. No. 6. pp. 289–290. With 1 chart in text. [2 refs.]

Comparatively few cases of fever clearly attributable to *B. faecalis alkaligenes* have been recorded. In the present instance a man aged 32 was admitted from the Alipuram jail, Bellary, with a history of four days fever, headache, malaise and mild diarrhoea. The fever lasted 15 days and the general condition was that of a typhoid patient. The blood showed no parasites nor agglutination for T.A.B. or C. in any dilution. *B. alkaligenes* was isolated from the faeces and was agglutinated by the patient's serum, but no details as to titre or attempt at isolation from the blood are given.

P. W. B-S.

Werner (Heinrich). Uber Fünftagefieber (Febris quintana). [**Five Day Fever.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Vol. 30. No. 1. pp. 194–203. [16 refs.]

This is almost entirely an historical account of what is known with us as Trench fever. The author states it is the tenth anniversary of his description of the fever, which is really an old and well known disease. In 1916 he failed to transmit the virus by intravenous injections of blood, but succeeded with intramuscular. After the introduction of ·5 cc. the infection developed in 20-23 days. In the discussion the applicability of the term " febris quintana " was debated.

P. W. B-S.

HELMINTHIASIS.

Joyeux (Ch.). L'helminthiase intestinale dans les colonies françaises. Prophylaxie et traitement d'après les récents travaux. [**Intestinal Helminthiasis in the French Colonies. Prevention and Treatment.**] —*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 3. 3a, 4a e 5a Sessões.) 1923. Aug. No. 4. pp.41–55.

The prevalent helminth infections in the French Colonial possessions are Ancylostomes, Ascaris and Trichiuris. Statistics give the incidence in soldiers, prisoners and hospital patients only. *Hymenolepis nana* is very rare. The eggs of *Oxyuris vermicularis* are rarely found in the stool. Other helminth parasites noted are rare cases of *Dipylidium caninum* in French Guiana, *Gastrodiscoides hominis* in Cochin-China and *Taenia saginata* in Sud-Oranais (Algeria). In dealing with the diagnosis of ancylostome infection, it is remarked that the number of eggs may differ in a stool according to its consistency. The hookworm larvae can migrate not more than 10 cm. in a horizontal direction, but vertically the distance covered may be much more. Larvae of Drosophila may play an important rôle in the destruction of larvae. In treatment, repeated dosing with thymol is recommended. The author's results show 86·5 per cent. of successful cures. Preliminary dieting is valueless and may even be harmful, but it is useful during the treatment. The author strongly recommends carbon tetrachloride—it may be administered in a spoon with a small amount of water spread over it to prevent inhalation. As a purge magnesium sulphate is used.

R. T. Leiper.

Espié (A.). Enquête sur l'helminthiase humaine dans la région Sfaxienne. **Human Helminthiasis in the District of Sfax, Tunis.** —*Arch. Inst. Pasteur de Tunis.* 1925. Dec. Vol. 14. No. 4. pp. 450–461.

The following parasites have been found to occur in Sfax, Tunis: Ascaris, Whipworms, Oxyuris, *Hymenolepis nana*; Ancylostomes. The author was unable to determine the species of Ancylostome present, but he regards this as the first record of hookworms from this area.

T. W. M. Cameron.

Daubney (R.). **Some Recent Advances in Medical Helminthology.**—*Kenya Med. Jl.* 1926. May. Vol. 3. No. 2. pp. 33–45.

In East Africa helminth infection is undoubtedly an important factor in the morbidity of the native population and is a certain source of trouble not infrequently to the European settler, but the comparative importance of the various helminths as they affect the public health of Kenya has yet to be decided. The paper read by Mr. R. Daubney, M.R.C.V.S., to the local branch of the British Medical Association summarizes with, on the whole, commendable accuracy the recent advances which have taken place in medical helminthology in various parts of the world and should stimulate local medical men to take a deeper interest in the natural history aspects of their clinical work. In this connexion it is noted that an examination of the faeces of the natives

in a reformatory in Kenya, carried out in conjunction with Dr. J. A. Carman, revealed hookworm in over 56 per cent. and an infestation of *Taenia saginata* in 15 per cent. of the inmates. From studies on the action of carbon tetrachloride in sheep, the author finds that magnesium sulphate is a valuable adjunct, reducing to nil the mortality in these animals from 33 per cent. when the drug was used alone.

R. T. L.

Yamazaki (S.). **On the Eggs of Parasites found in Human Stools, especially those of** *Clonorchis sinensis*, **in Taihoku and Neighbourhood.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1925. Dec. No. 249. English summary pp. 6–7. [In Japanese.]

Yamazaki examined 555 persons –mostly Japanese—and found 161 to be free from helminths. 46 per cent. were infected with Whipworms, 35 per cent. with Ascaris, 13 per cent. with Ancylostoma and small numbers with Clonorchis, Metagonimus, Oxyuris, Strongyloides and *Trichostrongylus orientalis*. He believes that a certain percentage of the clonorchis infections was contracted locally.

T. W. M. C.

Luger (A.). Zur Symptomatologie und Therapie der Eingeweidewürmer. [**Symptomatology and Treatment of Intestinal Worms.**] —*Mitt. d. Volksgsndhtsamt.* Vienna. 1925. Nov. 30. No. 11. pp. 503–510.

This paper deals with the helminth infections met with in Austria by the general practitioner, viz.: *Taenia saginata*, *T. solium*, Echinococcus, *Trichuris trichiura*, *Ascaris lumbricoides* and *Oxyuris* [*Enterobius*] *vermicularis*. An eosinophilia of 8 to 10 per cent. is not uncommon. In Oxyuris it may rise to 16 per cent. and in Ascaris to 19 per cent. Unusually high percentages occur in the cases of trichinosis, ancylostomiasis and echinococcus. In a mixed infection of whipworm, Ascaris and Oxyuris the author found the percentage to be 33 per cent. In Serbia in 1916, however, the author with Karmelic noted that 100 per cent. of the war captives examined harboured worms, but many showed little or no eosinophilia and in some cases there was actually an abnormally low percentage. In discussing symptomatology, the author refers to the possible rôle of the worms in introducing bacteria of pathogenic nature, and the discussion on therapy is illuminated by a series of prescriptions for the administration of santonin, thymol, beta-naphthol, and chenopodium, but the success of these is to be inferred. The presence of occult blood in the stool of patients harbouring Trichocephalus should always be kept in mind, as a wrong diagnosis of carcinoma or gastric or duodenal ulcer may be reached if one has failed to search also for the eggs of the whipworm.

R. T. L.

Kalantarian (E. W.). Zur Kenntnis der Helminthenfauna der Kinder Armeniens nach den Ergebnissen der helminthenovoskopischen Untersuchungen. [**The Helminth Fauna of Armenian Children.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Feb. 1. Vol. 30. No. 2. pp. 76–86.

The author examined 1,028 children and young adults in Armenia during the first six months of 1925, and found that 1,006, or 97·9 per

cent., were harbouring helminthic parasites of one kind or other. The main body of the paper is occupied by detailed findings on the different groups taken, the worms present and the combinations in which they occurred, but the following is a summary of the total findings. *Trichuris trichiura* proved to be the most frequent, 91·2 per cent. in all; in some of the groups this figure reached 100. The next commonest was *Ascaris lumbricoides*, 78·9 per cent. Others were relatively uncommon, *Trichostrongylus instabilis* being found in 181 or 17·7 per cent.; *Enterobius vermicularis* in 7·8 per cent.; *Hymenolepis nana* in 4 per cent.; *Taenia saginata* in 2·9 per cent.; and hookworm in 11 cases only. *Cysticercus cellulosae* was found in pigs, but not a single instance of human infection by *T. solium* was encountered.

H. Harold Scott.

Skriabin (K. I.). **The Results of Expedition to the Study of Helminthiasis Diseases in Coalminers in Don Miners Districts. (Preliminary Reports.)**—*Russian Jl. Trop. Med.* Moscow. 1925. No. 1–2–3. English summary p. 73. [In Russian pp. 57–60.]

Skriabin has examined the faeces of 7,500 miners in the Don district, and was unable to find any cases of hookworm. The parasites found were whipworms (71 per cent.), *Ascaris* and *Enterobius*, *Taenia saginata*, *Dibothriocephalus* and *H. nana*; *Fasciola hepatica*, *Dicrocoelium lanceatum* (21 times) and *Opisthorchus felineus* are also reported, while on 8 occasions he found a new *Rhabditis*.

T. W. M. C.

de Rivas (D.). **The Effect of Temperature on Protozoan and Metazoan Parasites, and the Application of Intra-Intestinal Thermal Therapy in Parasitic and other Affections of the Intestine.**—*Amer. Jl. Trop. Med.* 1926. Jan. Vol. 6. No. 1. pp. 47–73.

Finding that helminths and other parasites are easily destroyed *in vitro* by heat, de Rivas has tried the effect of duodenal or colonic lavages with salt solution or magnesium sulphate at a temperature of 44°-47° C. for *Oxyuris*, *Taenia saginata* and hookworms. He suggests the application of the technique to non-parasitic infections of the intestine.

R. T. L.

Lambert (S. M.). **Tests with Tetrachlorethylene : a New Anthelmintic.**—*Med. Jl. Australia.* 1925. Dec. 19. 12th Year. Vol. 2. No. 25. pp. 699–700.

Tetrachlorethylene, C_2Cl_4, was said to have a pleasanter taste and odour than carbon tetrachloride and to be equally potent and safe. The author obtained a purified product for trial and states that it has a very pungent, acrid odour. He found that 4 cc. were needed for satisfactory anthelmintic effect and that it possesses no advantages over the tetrachloride, either as regards efficiency, taste, or odour.

The contraindications to its employment are the same as for the tetrachloride and, like the latter, it has a selective action on the female Necator.

H. H. S.

Schlingman (A. S.). **Miscellaneous Tests of Tetrachlorethylene, a New Anthelmintic.**—*Jl. Amer. Vet. Med. Assoc.* 1926. Mar. Vol. 68. N.S. Vol. 21. No. 6. pp. 741–754. [7 refs.]

Schlingman has conducted a series of experiments with tetrachlorethylene on various animals and finds that it is as effective for dogs when given in hard capsules as in soft. It can be used safely for cats, foxes, sheep (including pregnant ewes), cattle and horses. It has no action against tapeworms in any of these animals but is very effective against blood-sucking worms in these hosts. It should be tested cautiously in man on account of its high safety and effectiveness in animals.

T. W. M. C.

Suchanka (Franz). Vergiftung und Tod nach einer Wurmkur mit Oleum Chenopodii. [**A Fatal Case of Chenopodium Poisoning.**] —*Mitt. d. Volksgsndhtsamt.* Vienna. 1926. Jan. 31. No. 1. pp. 14–16 also in *Wien. Klin. Woch.* 1926. Feb. 4. Vol. 39. No. 6. pp. 160–162.

A girl, 20 years of age, was given for Ascaris infection a mixture of oil of chenopodium and peppermint, with directions to take 10 15 drops three times a day for two days, and them to allow a fortnight to elapse. In order to obtain greater effect she took but little food. She appears to have waited only 6 days and then taken more. Soon afterwards she complained of giddiness, singing in the ears and a feeling of intoxication. In a few minutes she vomited and fell to the floor unconscious. The face was flushed, respiration slow. The next day the temperature rose to 39° C., the pulse was strong and regular and slow relatively to the temperature. The pupils reacted sluggishly. Convulsions supervened, involving at first the right side of the body and later giving place to flaccid paralysis. There was albuminuria. On the fifth day the pulse increased in rapidity till it became uncountable and death took place with signs of cardiac failure and oedema of the lungs.

The remainder of the paper is occupied by brief accounts of cases previously recorded. The second paper is a verbatim copy of the first.

H. H. S.

Dollfus (Robert Ph.). Distomiens parasites de *Muridae* du genre *Mus*. [**Trematodes Parasitic in the Genus** *Mus*.]—*Ann. Parasit. Humaine et Comparée.* 1925. Jan. & Feb. Vol. 3. Nos. 1 & 2. pp. 85–102; 185–205. With 16 figs. [29 refs.]

In nature species of the genus *Mus* harbour trematodes which can also parasitize man and they can be experimentally infected with trematodes of which normally man is the definitive host. It is therefore permissible to consider these rodents as agents in the spread of the

human infections. These conclusions are supported by the following list of the species so far recorded :—

Mus (*Mus*) *musculus* Linné, 1758.	*Distoma musculi* Rudolphi, 1819 *Lepoderma muris* Tanabé, 1922.
Mus wagneri Eversmann, 1848, *rotans* Droogleever Fortuyu, 1912 (jap. *nankinnézumi*) (variété de *M. musculus* L.),	
Mus (*Mus*) *sylvaticus* Linné, 1758.	*Distoma recurvum* Dujardin, 1845. *Distoma vitta* Dujardin, 1845.
Mus (*Epimys*) *rattus* Linné, 1758 (jap. *Kumanézumi, iyénézumi*).	*Echinostoma macrorchis* Ando et Ozaki, 1913. *Echinostoma aegyptiaca* Khalil et Abaza, 1924. *Clonorchis sinensis* (Cobbold, 1875). *Lepoderma muris* Tanabé, 1922. *Exorchis oviformis* Kobayashi, 1915. *Macroorchis spinulosus* Ando, 1919.
Mus (*Epimys*) *norvegicus* Erxleben, 1777 (=*decumanus* Pallas, 1778) (jap. *mizonézumi, dobunézumi, shironézumi, shichironézumi, daikokunézumi*).	*Echinostoma cinetorchis* Ando et Ozaki, 1923. *Echinostoma gotoi* Ando et Ozaki, 1923. *Echinostoma macrorchis* Ando et Ozaki, 1923. *Echinoparyphium japonicum* Ando et Ozaki, 1923. *Echinostoma spiculator* Dujardin, 1845.
Mus (*Epimys*) *norvegicus* Erxleben, 1777 (=*decumanus* Pallas, 1778 (jap. *mizonézumi, dobunézumi, shironézumi, shichironézumi, daikokunézumi*) (suite).	*Heterechinostoma magnovatum.* Stunkard et Haviland, 1924. *Clonorchis sinensis* (Cobbold, 1875). *Lepoderma muris* Tanabé, 1922. *Ascocotyle* (*Parascocotyle*) *diminuta* Stunkard et Haviland, 1924. *Distoma* sp. B. Podiapolsky, 1924.
Mus (sp. ?) (jap. *nonézumi*).	*Schistosoma japonicum* Katsurada, 1904. *Clonorchus sinensis* (Cobbold, 1875).

[Of the above forms, only *Clonorchis sinensis* and *Schistosoma japonicum* are parasites of man, and of these the bilharzia worm would alone appear to be possibly spread to any extent by rodents.]

R. T. L.

Faust (Ernest Carroll). **Further Observations on South African Larval Trematodes.**—*Parasitology*. 1926. Jan. Vol. 18. No. 1. pp 101–127. With 2 plates and 1 text fig. [35 refs.]

In addition to describing several new species of cercariae from South Africa, Faust returns to the morphological differences between human schistosome cercariae (this *Bulletin*, Vol. 17, p. 55). He

believes that these essential differentiating features lie in the number and microchemical reactions of the secretory cells which should be examined in the fresh state as well as preserved. Re-examination of his Venezuelan material of *S. mansoni* from *P. guadeloupensis* confirms the presence of four pairs of basophilic cells, and he suggests that the material examined by Khalil (this *Bulletin*, Vol. 20, p. 220) from *P. boissyi* may not be *S. mansoni*. He has also restudied his South African material—which he believes to be *S. haematobium*—and finds that although he had originally described only three pairs of acidophilic cells, there are present two pairs of acidophilic and three pairs of basophilic glands. He states that freshly prepared *toto* mounts show a picture similar to that originally described by himself, but that in slides which have been preserved for a year or more, five pairs of glands, as described by Blacklock and Thompson (this *Bulletin*, Vol. 21, p. 941), are present. He gives a table for the identification of these cercaria, the more important points of which are :—

Schistosoma.	*S. haematobium.*	*S. mansoni.*	*S. japonicum.*
Glands	2 pairs with large nuclei and granular acid protoplasm.		5 pairs
	3 pairs with basophilic protoplasm.	4 pairs.	5 pairs.
Duct openings.	5 pairs .	6 pairs.	5 pairs.

[Faust had not seen the paper by Bettencourt and de Silva (this *Bulletin*, Vol. 22, p. 868) when the present paper was written.]

T. W. M. C.

Cawston (F. G.). **Environmental Influences which favour the Development and Spread of the Bilharzia Parasite in South Africa. Food Supply of "Physopsis."** — *Jl. Trop. Med. & Hyg.* 1926. Mar. 15. Vol. 29. No. 6. pp. 89–91.

Cawston finds that the favourite food of *Isidora africana* or "Physopsis," which is the common carrier of Bilharzia in South Africa, is leaves of the lotus and similar plants. In pools containing these, domestic ducks are useful to destroy the snails. There is a danger to the inhabitants of Durban from vegetable infections, transmitted from such pools by Indians. He has been unable experimentally to infect *L. natalensis* with *S. haematobium*.

T. W. M. C.

Clapier. La bilharziose chez le tirailleur sénégalais. [**Bilharziasis in the Senegalese Tirailleur.**] *Ann. de Méd. et de Pharm. Colon.* 1926. Jan.–Feb.–Mar. Vol. 24. No. 1. pp. 56–67. [2 refs.]

The extent of bilharziasis in coloured troops in tropical Africa is still incompletely known. Clapier has examined two regiments especially for urinary bilharziasis and finds an infection of over 6 per cent. He draws attention to the dangers of the disease being disseminated through the movements of troops.

T. W. M. C.

Gibson (R. W. B.). **Bilharzia Disease of the Female Genital Tract.**—*S. African Med. Rec.* 1925. Sept. 26. Vol. 23. No. 18. pp. 413–414.

In women bilharziasis is less common than in man, not because of sex, but owing to other circumstances such as occupation. At the vulva the disease is most frequently of the hypertrophic type. Warty, papillary or polypoid growths often reach considerable size and can only be distiguished microscopically from venereal warts. In other cases deep ulcers destroy the hymen and clitoris. Papillary growths at the edge of these ulcers may cause them to be mistaken for carcinoma. Within the vagina the common lesion is sclerosis, the mucosa being much thickened and thrown into folds, with a wet sand appearance, easily bled. The cervix when affected has a close resemblance to carcinoma, taking the form of polypoid excrescences or small fibro-adenomatous tumours. Bilharzia infection of the uterus is unknown to the author. A case is briefly described of isolated affection of the fallopian tubes occurring in a woman who had spent the early years of her life in Durban.

R. T. L.

Lefrou (G.). Note sur la bilharziose en Afrique Equatoriale Française. [**Bilharziasis in French West Africa.**]—*Revista Méd. de Angola.* (No. especial 1e Congresso de Med. Trop. da Africa Ocidental. Vol. 3. 3a, 4a e 5a Sessões.) 1923. Aug. No. 4. pp. 135–139. [1 ref.]

In French Equatorial Africa the author has studied the local incidence of bilharziasis. He concludes that many of the cases are recent importations by the railway. The main focus is at Tchad, which is in constant communication with the Sudan by caravan. In the other regions only isolated cases occur. Planorbis and Limnaea are common in the whole region, but in spite of this fact bilharziasis is limited to the Tchad region. The author rightly comments on the loose use of the terms intestinal and urinary bilharziasis and suggests that in every case the name of the causal agent be appended, so that it may be clear if *S. haematobium* or *S. mansoni* be concerned.

R. T. L.

Dupuy (L.). Sur un cas de bilharziose intestinale à *Schistosoma haematobium*. [**Case of Rectal Bilharziasis due to** *S. haematobium*.]—*Ann. Soc. Belge de Méd. Trop.* 1925. June. Vol. 5. No. 1. pp. 37–39.

Infestation by *Schistosoma mansoni* is not uncommon in Katanga, but no urinary infestation by *S. haematobium* has been noted there. The author records the presence of eggs of the latter in the faeces of a patient who came under treatment for amoebic dysentery. The amoebae were cleared by five injections of emetine, but the mucoid, blood-streaked stools persisted and terminal-spined ova were found in abundance, and an occasional hookworm egg. The urine was quite normal. Two intravenous injections of 0·10 cgm. of emetine were given, and thymol for the hookworm. Daily examinations for the next 3½ weeks failed to find any more ova. Since so small an amount of

emetine seems inadequate to have brought about the death of the trematode the author asks whether the combination of emetine and thymol may not have been responsible for the result.

H. H. S.

Mersch. Un cas de bilharziose vésicale chez l'Européen au Katanga. **A Case of Vesical Bilharziasis in a European in Katanga.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Jan. Vol. 5. No. 2. pp. 197–199.

Mersch records what he belives to be the first case of vesicular bilharziasis in a European in the Belgian Congo. The case was successfully treated with emetine.

T. W. M. C.

Cutler (Max). **Bilharziasis in the United States and Canada. Report of a Case.**—*Jl. Amer. Med. Assoc.* 1926. Mar. 20. Vol. 86. No. 12. pp. 816–818. With 2 text figs. [13 refs.]

Cutler records the finding of the ova of *Schistosoma haematobium* in an Italian who had entered the United States ten years previously. Haematuria was noted for the first time a year after entry, but the general health was good. The ova were found in small numbers mostly embedded just below the epithelial layer of the bladder wall.

T. W. M. C.

Podzen (Bruno). Ueber einen Fall von Bilharziosis bei einem ehemaligen Kriegsteilnehmer. [**A Case of Bilharziasis in a Discharged Soldier.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Jan. 8. Vol. 30. No. 1. p. 35.

A man from East Prussia presented himself for treatment on account of increasing weakness. He was found to be anaemic and examination of the urine revealed ova of *Schistosoma haematobium*. He had served throughout the war in Russia, Macedonia, and Palestine, in the last of which the infection had probably been contracted. No further details are given.

H. H. S.

França (Carlos). Profilaxia da bilharziose. [**Prophylaxis of Bilharziasis.**]—*Revista Méd. de Angola.* (No. especial 1c Congresso de Med. Trop. da Africa Ocidental. Vol. 3. 3a, 4a e 5a Sessões.) 1923. Aug. No. 4. pp. 111–134. With 2 plates. [2 refs.]

During treatment with tartar emetic administered according to Christopherson's technique, the changes observed in the eggs passed in the urine were noted.

Some eggs, containing contracted embryos, were of normal outline with a spine, but the embryo appeared to be a spherical structureless mass. The embryo had apparently reached full development, but had been killed by the antimony. Other granular eggs were small, usually without spine but provided with a prominence. A third type of egg was shrivelled, smaller than normal, with folded shell; usually no embryo could be detected. These eggs appeared on the first day of treatment and gradually increased in number. It is suggested that the granular eggs are prematurely laid, and their increase in number is a good sign, as the tartar emetic apparently acts as an abortifacient.

R. T. L.

LAMPE (P. H. J.). **Bilharzia Treatment. Experience gained from more than 3,000 Tartar Emetic Injections. Precautionary Measures. Results obtained.**— *Jl. Trop. Med. & Hyg.* 1926. Jan. 1. Vol. 29. No. 1. pp. 4–10. With 4 text figs. [69 refs.]

The author has examined the population of various agricultural centres in Surinam and Paramaribo and finds that a large proportion is infected with schistosomiasis. In Kwatta, of 432 examined, 105 were infected, or 24·3 per cent.; in Charlesburg, an outlying district of Paramaribo, 31 out of 62. His first results of treatment by tartar emetic were not satisfactory, owing to impure preparations or to insufficient dosage. With the use of a purified product and adequate doses the results greatly improved. For outpatients, after three injections of 3 cc., 5 cc. and 7·5 cc. of a 1 per cent. solution, 8–10 cc., were given thrice weekly, and a total of 150–200 cc., the whole course occupying 6–7 weeks. For children, the dosage was proportionally reduced. For inpatients the treatment was more intensive, namely, 8–10 cc., six times weekly, after three smaller injections, the total being 200–240 cc. in 4–5 weeks.

Notes were kept of any disturbances, but few were of any moment. Mention is made of transient rheumatic pains, a troublesome cough just after injection, an inclination to vomit, and headache. Itching, urticaria and oedema are ascribed to anaphylaxis resulting from the large numbers of parasites destroyed. Of 326 patients undergoing the complete course 108 were discharged cured and careful examination for some months has not revealed any return of ova. The author finds that the total amount of the drug needed varies widely for different individuals, and he doubts, therefore, whether it is right to inject all patients with the fixed 200 cc. If the patient is suffering, in addition, from the effects of ancylostomiasis, the anaemia due to the latter should be cured before the antimony course is entered upon.

H. H. S.

LAMPE (P. H. J.). Bilharzia-behandeling. Ervaringen met ruim 3,000 tartarus-emeticus-injecties. Te nemen voorzorgen. Bereikte resultaten. [**Bilharzia Treatment. Experience with over 3,000 Injections of Tartar Emetic. Precautions. Results.**]— *Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 2. pp. 171–184. [69 refs.]

Tartar emetic is not a harmless drug. Many of the awkward sequels, however, may be ascribed to impurities. Lampe therefore quotes the tests of purity to which tartar emetic for intravenous injections should respond; these should be consulted in the original. He recommends the dosage according to CHRISTOPHERSON (25–30 gr. in 6–7 weeks). The results were very favourable. In every case in which the full course of treatment could be carried out disappearance of the parasites was attained. The Bilharzia *carrier* can always be cured, and this should be kept in mind, because the anatomical lesions of the Bilharzia *sufferer* are often incurable. The author is in doubt whether the dosage required by CHRISTOPHERSON is always necessary and is trying to find a criterion of the healing of the infection, to enable the physician to stop the cure at an earlier moment. He suggests that the eosinophilia (50–80 per cent.) which appears at a certain moment during the cure may be brought on by the death of great numbers of parasites, with

subsequent entry of foreign protein in the circulation resulting in anaphylaxis. Further experiments, however, are still required to confirm this opinion.

W. J. Bais.

Cawston (F. G.). **Intravenous Injections of Tartar Emetic in Bilharziasis.** [Letters, Notes and Answers.]—*Brit. Med. Jl.* 1926. Mar. 6. p. 462.

Cawston considers that unless very large doses of emetine, in the treatment of bilharziasis, are employed, it is necessary to continue the treatment uninterruptedly for at least 24 days, but that cardiac depression, which so often occurs during the third or fourth weeks, makes emetine risky. Rectal injections of tartar emetic are unsatisfactory, as the amount absorbed by the bowel cannot be estimated. Cawston considers that the method of choice is intravenous injections of tartar emetic provided the patient is carefully observed during the treatment.

R. T. L.

Anderson (J. Barcroft). **Rectal Injection of Tartar Emetic for Bilharziasis.** [Memoranda.]—*Brit. Med. Jl.* 1925. Oct. 17. p. 700.

Anderson considers that the "simplicity, safety, convenience and efficiency" of rectal injections of tartar emetic appear to make its intravenous injection no longer necessary.

R. T. L.

British Medical Journal. 1926. Mar. 20. p. 554. [Letters, Notes, etc.] **Rectal Injection of Tartar Emetic for Bilharziasis.** [Dye (William H.); Latham (D. V.).]

Small children can take up to 16 grains of tartar emetic by the rectum without toxic effects, but as the amount of the drug absorbed is unknown the use of hypodermic injections is preferred. Latham found rectal injections with tartar emetic quite unsatisfactory and without effect on a patient who was a typical case for treatment.

R. T. L.

Lampe (P. H. J.). Bilharziosis in Suriname. [**Bilharziasis in Suriname.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1925. Vol. 65. No. 5. pp. 546–560. 4 figs. on 2 plates. [49 refs.]

Since Flu in 1911 reported cases of bilharziasis in Surinam, the disease has repeatedly been met with and may be said to be far from rare. The schistosome is *S. mansoni*. The author promises further details on the biology of the transmitting snails and on the spread of the disease in Surinam, but gives now some figures about the number of cases observed at the Military Hospital (92 in 1923) and quotes a few cases of special interest, one in which the anatomo-pathological findings closely resembled miliary tuberculosis and another with disseminated myocarditis caused by eggs of *S. mansoni*. The last mentioned localization of the ova is so far unknown.

W. J. Bais.

Maciel (Heraldo). Algumas notas sobre a postura do " Schistosomum mansoni." [**Notes on the Behaviour of** *S. mansoni.*'—*Sciencia Medica.* 1924. Aug. 31. Vol. 2. No. 8. pp. 419–425. With 1 fig. [21 refs.]

From a daily examination of the faeces the author finds that, as a rule, the elimination of eggs in cases of bilharzia due to *S. mansoni* stops suddenly during treatment with tartar emetic or emetine. This stoppage frequently occurs even prior to the completion of the course of treatment. It happens, too, in cases where an intensive method of cure has been applied. There is also marked variation in the daily output of eggs in infected persons and a seasonal variation appears probable, the number of eggs eliminated in winter being much greater than in summer.

R. T. L.

Maciel (Heraldo). Algumas notas em torno do tratamento da Schistosomose Intestinal. [**Treatment of Intestinal Schistosomiasis.** —*Sciencia Medica.* 1925. Jan. 31. Vol. 3. No. 1. pp. 37–59. With 6 figs. and 2 plates. [43 refs.]

Neither " 914 " nor methylene blue is efficacious in the treatment of *Schistosoma mansoni* infection. Tartar emetic and emetine are accepted as proved remedies. For intestinal schistosomiasis the most convenient dose in the author's opinion is one giving 0·95 gm. as a total for a series of 10 injections. The initial dose being 0·05 gm. and the other nine injections of 0·1 gm. each. The emetine necessary for a cure amounts to 0·6 gm. for 10 injections, viz. 0·04 gm., 0·05 gm., 0·06 gm., 0·06 gm., 0·06 gm., 0·07 gm., 0·07 gm., 0·07 gm., 0·07 gm. Emetine should be reserved for use in those cases which are intolerant of tartar emetic. Adrenalin in water, by the mouth, is recommended as a preventive of accidents where there is intolerance.

R. T. L.

Fornara (L.). Emploi de l'émétique par voie rectale dans la Schistosomiase Mansoni. [**Rectal Use of Tartar Emetic in Rectal Schistosomiasis.**'—*Ann. Soc. Belge de Méd. Trop.* 1926. Apr. Vol. 6. No. 1. pp. 49–52.

Fornara has used tartar emetic intra-rectally in nine cases of rectal bilharziasis. No untoward results were observed, and in eight of the cases eggs disappeared from the stools. He used a total dosage of 1 2·5 gm. in 5–7 daily injections, and considers the treatment promising.

R. T. L.

Meleney (Henry Edmund), Faust (Ernest Carroll) & Wassell (Corydon McA.). **A Study of Intensive Antimony-Therapy in Schistosomiasis Japonica.**—*Jl. Trop. Med. & Hyg.* 1925. Apr. 15. Vol. 28. No. 8. pp. 153–165. With 6 figs. and 2 charts in text. [11 refs.]

While the use of tartar emetic in Egyptian schistosomiasis is now an established practice, in oriental schistosomiasis it is still on trial. A series of seven inpatients, suffering from a moderately severe attack, were treated and studied for the effect of the drug, which was administered about the rate of 2 gm. spread over two months. Eggs

ceased to appear after an average of 22 days in routine faecal smears ; miracidia were hatched up to the 32nd day until 1·32 gm. had been injected. The writers consider that 1½ gm. is probably sufficient for the cure of moderate cases. In their series it caused marked improvement and probably cured the condition. They recommend that the drug be used for incipient cases and those in the secondary stage of the infection, but caution is necessary in cases with advanced cirrhosis and ascites.

R. T. L.

Tai (J. T.). **Treatment of** *Schistosoma Japonica.*—*Nat. Med. Jl. China.* 1925. June. Vol. 11. No. 3. pp. 158–165.

The results obtained in the treatment of schistomiasis japonica with sodium antimony tartrate, colloidal antimony preparations and emetine leads the author to conclude that colloidal antimony is less efficient than sodium antimony tartrate, which is of definite value. Emetine treatment is definitely indicated whenever there is any difficulty in intravenous injections, especially in children. Prolonged use of antimony has always some potential danger, especially in advanced cases ; with emetine the author has not hitherto had bad effects using ½ gr. tablets twice daily. Practically none of the very advanced cases were cured by any sort of treatment and very few of them improved. Eggs sometimes reappear several days after cessation. In one case negative faecal examinations were recorded until the seventh day. The author recommends a continuous watch of the faeces for two weeks.

R. T. L.

Kawamura (R.) & Kasama (Y.). **Studies on Experimental Rickets. I. The Occurrence of Rickets in Young Rabbits born of Mothers infected with** *Schistosomum japonicum.*—*Jl. Experim. Med.* 1925. Dec. 1. Vol. 42. No. 6. pp. 793–798. With 9 figs. on 2 plates. [9 refs.]

Byfield & Daniels (1923) found it possible to induce gross rickets in experimental animals by faulty diet only up to the second generation. The authors show that the young born of rabbits affected experimentally with *Schistosoma japonicum* develop typical rickets. Rickets can also be produced by infecting young healthy rabbits. Since, however, a similar result can be obtained in the offspring by feeding the mother on egg-yolk the causal action is not limited to the toxin of this parasite. The schistosome toxin may disturb the calcium and phosphorus metabolism of bone in young animals especially during the period of vigorous growth from 20 to 40 days after birth or it may exhaust some important element in the calcium and phosphorus metabolism such as the vitamins A and D.

R. T. L.

Desage. Un cas de distomatose humaine. [**A Case of Distomiasis in Man.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. May 6. 3rd Ser. Year 42. Vol. 50. No. 15. pp. 720–722. [2 refs.]

Desage records a case of *Fasciola hepatica* (diagnosed from the ova in the stool) in a patient in Oran [Algeria]. He considers that cases are probably commoner than is generally supposed but are not diagnosed.

T. W. M. C.

Porter (Annie). *Limnaea truncatula* **as an Intermediate Host of** *Fasciola hepatica* **in South Africa.**—*S. African Jl. Sci.* 1925. Nov. Vol. 22. pp. 309–310.

Porter finds, in addition to *Limnea natalensis* and *Isidora tropica*, that *Limnea truncatula* is a host of *Fasciola hepatica* in South Africa. She records the finding in the faeces of a South African, suffering from epilepsy and with dysenteric symptoms, of ova indistinguishable from *F. hepatica.*

T. W. M. C.

Bradley (Burton). **Observations on the Water Snails of Monaro and New England, New South Wales, with Especial Reference to their Cercaria Carrying Capacity.**—*Med. Jl. Australia.* 1926. Feb. 6. 13th Year. Vol. 1. No. 6. pp. 147–159. With 5 text figs.

Bradley, from a survey of snails in infected regions, comes to the conclusion that *L. brazieri* is probably the transmitting agent of *Fasciola hepatica* in N.S.W.

T. W. M. C.

McKay (A. C.). **A Note on the Intermediate Host or Hosts of** *Fasciola hepatica* **in New South Wales.**—*Med. Jl. Australia.* 1926. Mar. 13. 13th Year. Vol. 1. No. 11. p. 300. [3 refs.]

——. **An Intermediate Host of** *Fasciola hepatica* **in New South Wales.**—*Jl. Australian Vet. Assoc.* 1926. Mar. Vol. 2. No. 1. pp. 9–14. With 2 figs.

McKay records the fact that he has definitely shown that *F. brazieri* is an intermediate host by means of feeding experiments in guineapigs. But he questions whether it is one of the chief carriers.

T. W. M. C.

i. Montgomerie (R. F.). **The Treatment of Liver Rot with Preparations of Male Fern—a Historical Survey.**—*Jl. Comp. Path. & Therap.* 1926. Mar. Vol. 39. Pt. 1. pp. 38–42. [34 refs.]

ii. ——. **Carbon Tetrachloride in Liver Rot of Sheep.**—*Ibid.* June. Pt. 2. pp. 113–131. [9 refs.]

iii. ——. **The Efficiency of Tetrachlorethylene in Liver Rot of Sheep.**—*Ibid.* pp. 132–133. [3 refs.]

i. In these three publications Mr. Montgomerie, Veterinary Adviser, University College, Bangor, makes an important contribution to the question of the control of liver rot in sheep. Marek had advocated a preparation of male fern prepared under his direction and said to consist of lipoid soluble substances. This appeared under the proprietary name first of "Distol" and later of "Danistol." For this drug a high degree of success was claimed, but its use was to some extent limited by its price. The author is to be congratulated on having explored the relative merits of Danistol and liquid extract of male fern B.P. He now confirms his earlier conclusions that at least one brand of the liquid extract "can be successfully, and at a reasonable cost, employed on an extensive scale". He goes on to say "compara-

tive field trials indicated that Danistol was no more efficient than this extract." The number of sheep treated during 1924–25, and of which the author had knowledge, totalled over 30,000.

ii. Hall quoting Jeffreys stated that carbon tetrachloride was 100 per cent. effective against intestinal flukes in foxes, but hitherto there had been no extensive trials of its use in liver fluke disease, and indeed one of the contraindications for carbon tetrachloride is the presence of liver lesions. In the present paper Montgomerie shows as a result of tests on 172 flukey sheep with pure carbon tetrachloride that the drug has a reliable anthelminthic action. A single dose of 1 cc. in soft gelatine capsules was found to be a therapeutic dose for sheep weighing up to 140 lbs. affected with liver rot. Half a cc. cured two sheep weighing 40 and 42 lbs. In no case were toxic symptoms observed. The drug compares very favourably with male fern. Its efficiency is at least equal, its cost considerably less, and it appears to be a safer drug.

iii. Tetrachlorethylene, although quite as effective against hookworms as carbon tetrachloride, is shown to have no action on liver fluke.

R. T. L.

Choy (Paul D.) & Ludlow (A. I.). **Ova of *Paragonimus westermanii* encysted in the Abdominal Wall.**—*China Med. Jl.* 1926. Apr. Vol. 40. No. 4. pp. 326–328. With 3 figs. [8 refs.]

Choy and Ludlow record a case in a Korean in whom a fibrous growth was found on the epigastrium which contained ova of *Paragonimus*.

T. W. M. C.

Iwaka (Genei). [**On the Therapeutic Efficacy of Hydrochlorate Emetin against Lung Distomiasis.**] *Chosen Igakkwai Zasshi* (*Jl. Korean Med. Soc.*) 1925. May. No. 55. [Summarized in *Japan Med. World.* 1925. Dec. 15. Vol. 5. No. 12. p. 360.]

The author has had marked results with emetine hydrochloride against lung flukes, the bloody sputum soon ceasing and the eggs disappearing.

T. W. M. C.

Faust (E. C.) & Khaw (O. K.). **Excystment Phenomena in *Clonorchis sinensis*.**—*Proc. Soc. Experim. Biol. & Med.* 1925. Dec. Vol. 23. No. 3. pp. 245–248.

Although Clonorchis infection of dogs and cats is common throughout China and Japan, in man the parasite is confined to a restricted area in Japan, southern Korea, Kwangtung province (China), and Tonkin. The first intermediate host is *Bythinia striatula*, the second being practically any species of fresh water fish. In the fish the cercaria secretes a viscous fluid, which forms an inner true cyst. The presence of this capsule in the fish causes the formation of an outer fibrous capsule by the fish. Experiments—*in vivo* and *in vitro* —were conducted to determine the fate of the cercaria after being swallowed by the definitive host. The authors find that the fibrous cyst is digested in the stomach, and although the true cyst is unaffected by the gastric juice, those remaining in the stomach for 14 hours do not develop. In those which pass to the duodenum, the true cyst is weakened and

the cercaria, stimulated to activity, ruptures the weakened cyst and escapes. The larval flukes attach themselves to the mucosa and mass in the region of the opening of the common duct. 48 hours after feeding the larvae have all migrated into the duct and from the 72nd hour onwards were found passing into the bile passages. The authors believe that only about 20 per cent. of the viable larvae excyst and only 5 per cent. actually reach the duct. This work suggests that the passage of the larvae to the liver is direct and not via the portal vein.

T. W. M. C.

Faust (Ernest Carroll) & Khaw (Oo-Keh). **The Egg-Laying Capacity of** *Clonorchis sinensis.*—*Proc. Soc. Experim. Biol. & Med.* 1926. Apr. Vol. 23. No. 7. pp. 606–607.

The authors consider that egg laying in Clonorchis is a continuous process, and that the irregularity of eggs in the stool is due to host irregularities. The egg-laying capacity differs with the host animal—the numbers laid in the cat being more than double those in the dog.

T. W. M. C.

Faust (Ernest Carroll), Ke-Fang (Yao), Khaw (Oo-Keh) & Yung-An (Chao). **Experimental Therapy in Clonorchis Infections.**—*Proc. Soc Experim. Biol. & Med.* 1926. Apr. Vol. 23. No. 7. pp. 607–608.

The authors find that mercurochrome and gentian violet accelerate speed of egg production of Clonorchis in dogs and cats. Mercurochrome in lethal doses has no apparent clonorchicidal value, but tolerated doses of gentian violet cause the death of all Clonorchis in those parts of the bile passages reached by the dye. In light infections 100 per cent. and in heavy infections 90 per cent. are killed in this way. Oral administration requires prolonged treatment with small doses. Its use in human therapy is suggested.

T. W. M. C.

Reed (Alfred C.) & Wyckoff (Harry A.). **Cure of Clonorchiasis by Tartar Emetic.**—*Amer. Jl. Trop. Med.* 1926. Mar. Vol. 6. No. 2. pp. 115–117.

Reed and Wyckoff record the cure of a case of clonorchiasis in a Chinese woman following a course of tartar emetic.

R. T. L.

Einarsson (Matthias). L'echinococcose en Islande. Sur le mode de contamination humaine. [**Echinococcosis in Iceland. Method of Spread to Man.**] *Ann. Parasit. Humaine et Comparée.* 1926. Apr. 1. Vol. 4. No. 2. pp. 172–184. With 1 text fig.

In 1863 Krabbe found in Iceland 20 dogs per 100 inhabitants; in 1922 this number had decreased to 7 per 100. A statistical survey showed that nearly 12·5 per cent. of sheep harboured hydatid cysts—almost invariably in the liver. Krabbe had found that 28 per cent. of the dogs harboured the adult parasites, but the present number is not

known. The author finds that the great majority of the infections are found in man between the ages of 20 and 40, and that females are three times as frequently affected as males. He believes that this is due to the practice of keeping the ewes and cattle in intimate contact with the women and children. The animals accumulate dried faeces on the skin, and so transmit them mechanically to the hands of the attendants. He believes that adequate cleaning of the hands before cooking and eating would greatly reduce the incidence.

T. W. M. C.

Cameron (Thomas W. M.). **Observations on the Genus *Echinococcus* Rudolphi, 1801.** – *Jl. Helminthology.* 1926. Mar. Vol. 4. No. 1. pp. 13–22. With 2 text figs. [4 refs.]

From the medical and economic points of view *Taenia echinococcus* is one of the most important of the tapeworms of carnivores. Its larval stage, the "Hydatid", assumes many diverse forms, but most modern workers consider that these all arise in the life cycle of a single species with the possible exception of the alveolar type found in Central Europe. The author has revised the genus with the result that he recognizes four distinct species, of which two are described and named as new. *Echinococcus cruzi* Brumpt and Joyeux 1924 is placed in the synonymy of *E. oligarthrus* (Diesing 1863), which is considered a valid species and was first recorded as a parasite of *Felis concolor*. The two new species are *E. longimanubrius* from the Cape hunting dog and *E. minimus* from *Canis lupus* in Macedonia. The specific differences are found in the size and shape of the hooks. It has not been possible to distinguish between the forms on the genitalia owing partly to the paucity of suitable material.

R. T. L.

Dew (Harold R.). **The Mechanism of Daughter Cyst Formation in Hydatid Disease.** *Med. Jl. Australia.* 1926. Apr. 24. 13th Year. Vol. 1. No. 17. pp. 451–460. With 12 figs. [16 refs.]

Dew continues his series of papers on the development of hydatid (this *Bulletin*, Vol. 21, p. 209; Vol. 22, p. 480; Vol. 23, pp. 250–251). He has previously shown that daughter cysts are the result of something which threatened the life of the mother cyst, and in this paper he discusses the mode of origin of these cysts. He finds that they most commonly rise from the detached germinal layer but may also develop from brood capsule cells or, rarely, by vesicular changes from detached scolices. He has repeated and confirmed Dévé's work on this point and finds that intramuscular or subcutaneous injections of scolices in about 70 per cent. of cases give rise to new cysts. He discusses the exogenous formation of daughter cysts. In man these are found practically only in the omentum and in bones. The omental cysts—which themselves are secondary—cause daughter cyst formation by herniations of both germinal and laminated layer through weakened parts of the adventitia, resulting from intercystic pressure. These herniations are finally excluded and form new cysts. Recurrent cysts are secondary cysts forming from several brood capsules or scolices implanted in an operation wound or elsewhere, which develop inside a common irregular adventitia and show a structure simulating exogenous

budding. Normal endogenous daughter cysts have no adventitia and so they are able to produce, by herniation of both layers, grand-daughter and even great-grand-daughter cysts. In osseous hydatid, the original cyst spreads in the line of least resistance through the bony canals; the adventitia is irregularly placed and the pouching of the cyst may become constricted and finally cut off. There is, however, no true mother cyst in this case. He is unable to accept the old cell-islet theory as the cause of exogenous cysts in man at least.

Dew draws attention to the clinical importance of secondary hydatid which may result from the spilling of hydatid seed at operations or from rupture of the mother cyst and he recommends formalin injections into cysts before removal. Hydatid embolism may also occur after rupture of the mother cyst, and he believes that this is the explanation of most cases of multiple cysts in the lungs, head and brain.

T. W. M. C.

Dévé (F.). Evolution vésiculaire du scolex échinococcique obtenue *in vitro*. La culture artificielle du kyste hydatique. [**Vesicular Development of the Echinococcus Scolex obtained in Vitro.**]—*C.R. Soc. Biol.* 1926. Feb. 26. Vol. 94. No. 7. pp. 440–441. [3 refs.]

Horse serum was added to tubes of sterile hydatid fluid and scolices. After four days at 37° C. some of the scolices had commenced to become vesicular; at the 14th day some scolices were found about three times their original volume. They were not degenerate and had an intact cuticle, and Dévé believes that they had commenced the formation of secondary cysts. This work is being continued.

T. W. M. C

Nicholls (Lucius). **A Case of Mass Infestation with** *Cysticercus Cellulosae.*—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Nov. 18. Vol. 1. Pt. 3. pp. 141–142. With 4 figs. on 1 plate.

A male patient, 34 years of age, was found dead without previous signs of illness or ill-health. Very large numbers of cysticerci of *T. solium* were found throughout the muscles of the body. The heart muscle was heavily infected and this was concluded to be the cause of death. From three square inches of the latissimus dorsi 22 cysts were removed. Unfortunately, the intestine was not examined for adult tapeworm, so that it is not known how infection was acquired. A very fine plate accompanies the brief record.

R. T. L.

Price (Emmett W.). **The Occurrence and Distribution of** *Cysticercus cellulosae* **in Texas Swine.**—*Jl. Parasit.* 1925. Dec. Vol. 12. No. 2. pp. 81–83. With 1 map.

C. cellulosae is not uncommon in pigs in Texas, and a map is given showing the distribution of the parasite in that State. It is commonest in counties with a large Mexican and Negro population.

T. W. M. C.

Lyon, Jr. (M. W.). **Native Case of Infestation by the Fish Tapeworm** *Diphyllobothrium latum.*—*Jl. Amer. Med. Assoc.* 1926. Jan. 23. Vol. 86. No. 4. pp. 264–265. [9 refs.]

Eight definite cases of infection with *Dibothriocephalus latus* have been recorded from the Great Lakes district of the United States. Lyon records a ninth from the same region in a boy of four years who had never left the district. He showed no symptoms at all, and the parasite was expelled during an attack of scarlet fever.

T. W. M. C.

Redlich (E.). *Diaptomus graciloides* (Lilljeborg), ein neuer erster Zwischenwirt von *Dibothriocephalus latus*, nebst Bemerkungen zur experimentellen Entwicklung des Procercoids dieses Cestoden. [*D. gracilioides*, **a New Intermediate Host of** *D. latus*. **Experimental Development of the Procercoid.**]—*Arch. f. Wissenschaft. u. Praktische Tierheilk.* 1925. Nov. 12. Vol. 53. No. 4. pp. 353–361. With 7 figs. on 1 plate. [10 refs.]

In observing cultures of the early stages of the onchospheres of *Dibothriocephalus latus* the author found that he got better results with ova obtained from the gravid uterus of the worm, in particular those from segments which appeared brown owing to the presence of air, and placed in water, than from ova obtained from faeces. The times needed for development at different temperatures are stated, the average at room temperature being 10–13 days. Whether sea-water or tap-water was used made practically no difference, only 24 hours or so longer on the average, while the procercoid itself attains its development in 14–21 days.

Besides the *Cyclops strenuus* and *Diaptomus gracilis*, the *D. graciloides* was found by the author to be a very efficient intermediate host, in fact even more so than the two former, in that it might contain as many as five procercoids at once.

H. H. S.

Chandler (Asa C.). **New Records of** *Bertiella satyri* **(Cestoda) in Man and Apes.**—*Parasitology.* 1925. Oct. Vol. 17. No. 4. pp. 421–425. With 2 text figs. [3 refs.]

Chandler redescribes *Bertiella satyri*—normally a parasite of apes—and records a case of infection in an Indian girl. A key to the various species of the genus is given.

T. W. M. C.

Sandground (J. H.). **Speciation and Specificity in the Nematode Genus** *Strongyloides.*—*Jl. Parasit.* 1925. Dec. Vol. 12. No. 2. pp. 59–80. With 2 plates. [38 refs.]

Sandground has made morphological and biological studies on the various species of Strongyloides available. He criticizes the practice of creating new species based purely on size and host, and regards "host specificity" as the best means of determining the validity of a species. He finds that *S. stercoralis* of man can also infect dogs and (to a lesser degree) cats, and he believes that this species is a normal

canine parasite in Asia. Two species exist in monkeys—*S. cebus* in new world monkeys and *S. fülleborni* in old world monkeys. He has been unable to determine the standing of *S. nasua* found by DARLING in monkeys, examination of the type material disclosing no differences from *S. stercoralis*. *S. westeri* occurs in horses and *S. papillosus* in ruminants and pigs. He describes new species from the rat (60 per cent. of the Baltimore rats are infected) and from *Hydrochoerus hydrochoera*. He regards as at least doubtful the following species :— *S. ovocinctus, S. suis, S. vituli, S. siminae, S. canis.*

T. W. M. C.

SANDGROUND (J. H.). **Biological Studies on the Life-Cycle in the Genus *Strongyloides* Grassi, 1879.**—*Amer. Jl. Hyg.* 1926. May. Vol. 6. No. 3. pp. 337–388. With 2 text figs. and 4 figs. on 1 plate. [39 refs.]

The factors which determine the alternative modes of origin of the infective larvae of Strongyloides have still to be determined. In most species of this genus the infective larvae are derived either from the direct metamorphosis of the rhabditiform larvae found in the stool, and derived from the parasitic generation, or they are produced only after the intervention of a free-living generation of males and females. It was thought that temperature, humidity, constitution of the faeces, might so affect the rhabditiform larvae as to determine them on the direct or indirect course of development, but the work of BRAUN (1899) and others has proved that both modes of development may co-exist in cultures from a suitable case, and this can be demonstrated effectively by using the Baermann isolation technique on large cultures. Attempts by the process of selection to isolate strains exclusively showing only one type of development were unsuccessful. Infections of certain abnormal hosts lead to changes in the life cycle, and it is suggested that in certain species direct development originally followed upon the introduction of the more primitive heterogonic parasite into new species of hosts. The parasitic adult of Strongyloides is at present held by many to be parthenogenetic, but a cytological study of the gonads indicates that it is really hermaphroditic. This suggests that the determining factor is the chromosomal constitution of the eggs and that the sex of the free-living adult is determined by the presence or absence of a heterochromosome in the sperm.

R. T. L.

CHANDLER (Asa C.). **The Species of *Strongyloides* (Nematoda).**—*Parasitology*. 1925. Oct. Vol. 17. No. 4. pp. 426–433. With 2 text figs. [9 refs.]

GOODEY (T.). **Observations on *Strongyloides fülleborni* von Linstow, 1905, with some Remarks on the Genus *Strongyloides*.**— *Jl. Helminthology*. 1926. May. Vol. 4. No. 2. pp. 75–86. With 8 text figs. [5 refs.]

A study of the morphology of the species of the genus *Strongyloides*, which includes the common nematode intestinal parasite of man, *S. stercoralis*, leads the author to suggest that the various species should be grouped into two only, viz. : *S. papillosus* and *S. stercoralis*, and that the forms hitherto regarded as distinct species under the names

ovocinctus, *fülleborni*, *suis*, *simiae* and *cebus* be reduced to host varieties or subspecies of *papillosus*, and the forms named *nasua*, *canis* and *felis* be made varieties or subspecies of *S. stercoralis*. It is considered that the morphology of the parasitic parthenogenetic females and their biological characteristics are more reliable for the differentiation of the various forms of *strongyloides* than is the morphology of the more variable free-living adults. Dr. Goodey's article is chiefly directed, from a re-examination of material, to the rebutting of Chandler's main contentions. R. T. L.

Castex (Mariano R.) & Lorenzo (Ramón). Sobre dos casos de parasitismo por el Strongilodes estercoralis. [**Cases of Infestation by** *Strongyloides stercoralis*. —*Prensa Méd. Argentina*. 1923. July 30. 19 pp. With 1 fig. [7 refs.]

In case I there were large numbers of embryos in the faeces, and the blood count gave an eosinophilia of 19·54 per cent. Repeated dosing with small doses of thymol and of chenopodium oil has failed to eliminate the infection.

In case II the treatment consisted of thymol in 1 gm. doses every hour for five hours until a slight degree of intoxication was noticed, when the treatment was stopped. Various other treatments were tried, including sodium cacodylate, daily injections of bioplastine, lanoline inunctions, glycerine in gelatine capsules each containing 25 gm. at intervals of two hours between each dose followed by an enema of 30 gm. of glycerine in water two hours later. The author reports that the glycerine treatment had a very favourable effect as the larvae disappeared from the stools. The case was complicated with hookworm and whipworm.

R. T. L.

Semenov (G. M.). [**The Occurrence of** *Strongyloides stercoralis* **in Tashkent and the Biology of its Larvae.**]—*Russian Jl. Trop. Med.* 1926. No. 2. pp. 7–12. With 2 text figs. [In Russian.]

The author records the finding of rhabditiform larvae of *Strongyloides stercoralis* from the stool of a patient suffering from malaria. This is the first record of the species for Turkestan, and the fourth for Russia. The larvae measured 200–300 μ in length and 22–25 μ in breadth. When kept at 20° and 35° C. they all developed into the filariform stage, measuring 450–500 μ in length. The author tested the influence of various chemical and physical agencies upon the filariform larvae and found that desiccation, direct sunlight and temperatures from 48 to 50° C. rapidly killed them; mercury perchloride (1 : 2,000, 1 : 1,000) was practically ineffective, whilst 2·5 per cent. carbolic acid and silver nitrate (1 : 2,000 solution) killed them within several minutes.

C. A. Hoare.

Sarcinella (F.). Anguilluloses graves traitées par l'émétine. [**Treatment of Strongyloides Infections with Emetine.**]—*Ann. Soc. Belge de Méd. Trop.* 1926. Jan. Vol. 5. No. 2. pp. 205–207.

Sarcinella states that he has very frequently observed diarrhoea due to Strongyloides, and describes three cases in which there were general disturbances as well—a generalized oedema being common to all. He suggests the use of emetine in the treatment of these infections.

R. T. L.

Chandler (Asa C.). **A Contribution to the Life-history of a Gnathostome.**—*Parasitology.* 1925. Aug. 28. Vol. 17. No. 3. pp. 237–244. With 6 text figs. [3 refs.]

Chandler finds that many of the snakes dying in the Calcutta Zoological Gardens harbour Gnathostoma larvae. When fed to young cats, the young gnathostomes were recovered from the liver tissue and elsewhere, but only slightly more developed. About 10 per cent. of local cats, not fed on the larvae from snakes, also harbour the parasite in an immature condition.

T. W. M. C.

Gupta (B. N.). **A Fatal Result associated with Filarial Infection.**—*Indian Med. Gaz.* 1926. Feb. Vol. 61. No. 2. pp. 75–76.

Gupta records a fatal case of intermittent fever and icterus at Howrah hospital, when nothing abnormal was found except the presence of microfilaria in the blood on the morning of admission. He states that as filarial septicaemia is unknown, the case is of interest as being one possibly of some other septicaemic condition in which the microfilaria simply came out into the peripheral circulation of the unconscious patient as they would have done if he was sleeping.

R. T. L.

Rao (P. Rajeswara). **Antimony and Filariasis.**—*Indian Med. Gaz.* 1926. Mar. Vol. 61. No. 3. p. 121.

Rao has used sodium antimony tartrate injections for the past four years in cases of filariasis and finds that although the blood has not been rendered free from the microfilaria, the pathological effects can be cured.

R. T. L.

Manson-Bahr (Philip). **On the Longevity of the *Loa loa* and some hitherto Undescribed Manifestations of this Infection.**—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Vol. 29. No. 1. pp. 222–224. With 2 figs. on 1 plate. [4 refs.]

Manson-Bahr records two cases of *Loa loa* infection in one of which the observed life span of the parasite was considerable nearly 17 years; while in the other embryos were absent from the blood stream for a number of years and permanent induration of the connective tissue was apparently caused by the adults.

T. W. M. C.

Sharp (N. A. Dyce). **A Contribution to the Study of *Onchocerca volvulus* Leuckart, with some Observations on its Prevalence in Nigeria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Jan. 21. Vol. 19. No. 7. pp. 373–388. With 1 plate and 2 text figs. [20 refs.]

Tumours due to *Onchocerca volvulus* are common in Northern Nigeria, and appear to be painless and harmless. Skin examination showed the absence of *Igamofilaria streptocerca*, only *O. volvulus* being found – usually causing no reaction, but sometimes with a layer of definite inflammatory change.

It is pointed out that none of the arguments implicating *F. bancrofti* as the cause of elephantiasis are conclusive, and he suggests a possible connexion between Onchocerca and the disease. Out of 25 hydroceles

examined, only 16 per cent. were infected with *Mf. bancrofti*, while 40 per cent. were infected with *Mf. volvulus*. The embryo of *Onchocerca volvulus* is described and illustrated, as stained with dilute Giemsa for two hours.

The tumours characteristic of the disease are only found in the later stages, and often onchocerciasis may exist without the formation of nodules at all. The writer has tried a Bayer preparation—B. 1916—in a case of the disease with excellent results.

T. W. M. C.

Blacklock (D. B.). **The Development of** *Onchocerca volvulus* **in** *Simulium damnosum.—Ann. Trop. Med. & Parasit.* 1926. Feb. 11. Vol. 20. No. 1. pp. 1–48. With 16 figs. on 4 plates and 12 text figs.

Blacklock was able to find larvae of *Onchocerca volvulus* in 45 per cent. of the inhabitants of Konno, Sierra Leone. The larvae may be present without causing any skin lesions at all, and no definite relationship between the presence of the larvae and skin or eye disease could be established. *Simulium damnosum* is a day-biting fly, which takes some time to pierce the skin and reach the blood and so inflicts a wound such as would dislodge the larvae of *Onchocerca* from the skin. Dissections of wild flies captured during biting showed that 2·6 per cent. had in their gut larvae which appeared to be *Onchocerca*, while in the thorax of 1 per cent. were larvae in a more advanced state of development. Flies were fed on infected skin and kept alive as long as possible, and a large percentage were found to be infected in the thorax—much higher than in casual collections. The larvae in the skin and in the fly are described.

T. W. M. C.

Blacklock (D. B.). **The Further Development of** *Onchocerca volvulus* **Leuckart in** *Simulium damnosum* **Theob.**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 203–218. With 1 fig. and 1 plate.

Using "wild" specimens of *Simulium damnosum*, Blacklock has continued his experiments and finds that the parasite after developing further in the thorax, and altering in size and shape, proceeds to the head of the fly, and under suitable conditions these forms readily escape from the proboscis (as when brought into contact with warm monkey serum). Flies have not been kept alive for more than 19 days, but Blacklock states that the shortest period which elapses after feeding before the proboscis becomes infected was 7 days [but he was using wild and, consequently, uncontrolled flies].

T. W. M. C.

Baylis (H. A.), Pan (T. C.) & Sambon (Juliet E. B.). **Some Observations and Experiments on** *Gongylonema* **in Northern Italy. A Preliminary Note.**—*Jl. Trop. Med. & Hyg.* 1925. Dec. 1. Vol. 28. No. 23. pp. 413–419. With 14 text figs. [5 refs.]

The writers have investigated the life histories of several species of Gongylonema in northern Italy, and find that dung-beetles—which are

found only in the open—are the natural intermediate hosts of the cattle species. Household insects and cockroaches are not naturally infected, although large numbers were carefully examined. It was found possible, however, to infect *Blattella germanica* with the cattle Gongylonema, but not *Blatta orientalis*. Feeding experiments of rats with *B. orientalis* were negative, although two were infected with larvae dissected from dung-beetles and *B. germanica*. No naturally infected rats were found.

T. W. M. C.

Baylis (H. A.). **On the Identity of** *Gongylonema subtile* **Alessandrini.**—*Jl. Trop. Med. & Hyg.* 1925. Oct. 15. Vol. 28. No. 20. pp. 361–362. [13 refs.]

Baylis has examined the specimens which Alessandrini collected from an Italian girl in 1914, and described as a new species of Gongylonema—*G. subtile*—and finds that they are identical with *G. pulchrum*.

T. W. M. C.

Panayotatou (Angelica). **A Case of Ascaridiasis with Benign Jaundice,**—*Brit. Jl. Children's Diseases.* 1925. July–Sept. Vol. 22. Nos. 259–261. pp. 218–220. [2 refs.]

The subject, a boy of 8, was admitted to the clinique with generalized jaundice but neither pain nor pyrexia. There was no intestinal disturbance apart from nausea, dizziness and lack of appetite. Ascaris ova were found in the stools, and after treatment with santonin and calomel, he passed ten worms. Two days later he appeared normal. The writer suggests that the possibility of Ascaris should be considered in all illnesses of the intestinal canal.

T. W. M. C.

Rico (J. Toscano). Sur la sensibilité de l'*Ascaris lumbricoides* à l'action de quelques drogues. **The Sensitiveness of** *A. lumbricoides* **to the Action of Certain Drugs.**]—*C. R. Soc. Biol.* 1926. Apr. 9. Vol. 94. No. 12. pp. 921–923. With 2 text figs. [2 refs.]

Rico has tested the paralysing action of chenopodium, male fern, santonin, etc., on the Ascaris of the pig; the full results of which he will publish at a later date. He finds that the anterior and posterior parts of the worm are much more active than the middle.

T. W. M. C

Rico (J. Toscano). Sur l'emploi de l'*Ascaris lumbricoides* comme réactif pharmacologique. Action de la nicotine. [**The Use of** *A. lumbricoides* **as Pharmacological Reagent.**] *C. R. Soc. Biol.* 1926. Apr. 9. Vol. 94. No. 12. pp. 918–920. With 1 text fig. [9 refs.]

Rico points out that parasitic helminths have been relatively seldom used to study the pharmacological action of anthelmintics. Using *Ascaris lumbricoides* of the pig he finds that nicotine causes the cessation of spontaneous movements—especially in the anterior portion of the worm.

T. W. M. C.

Harigopal (A. R.). **A Case of Night-Blindness due to *Ascaris lumbricoides* Infection.**—*Indian Med. Gaz.* 1926. Mar. Vol. 61. No. 3. p. 130.

A case of night blindness in a boy of six, for which no cause could be found, disappeared after the expulsion of a number of Ascarids after treatment with santonin. Harigopal states that he has seen other similar cases cured in this manner.

R. T. L.

Africa (Candido M.) & Mendoza-Guazon (Maria Paz.). **Is there Ascaris Nephritis ?**—*Jl. Philippine Islands Med. Assoc.* 1926. Feb. Vol. 6. No. 2. pp. 49–54. [6 refs.]

These writers discuss the case of a boy who died from an acute haemorrhagic nephritis and who suffered from a heavy ascarid infection. They consider that the nephritis may have been caused by the continued destructive action on the glomeruli of migrating ascarid larvae, owing to the resemblance to Yokogawa's experimental cases in guineapigs and dogs. The other changes they ascribe to the ascarid toxins absorbed from the alimentary tract.

R. T. L.

Dognon (A.) Action de la température sur la radiosensibilité de l'oeuf d'Ascaris. [**Effect of Temperature on the Radiosensitiveness of the Ascaris Egg.**]—*C. R. Soc. Biol.* 1926. Feb. 26. Vol. 94. No. 7. pp. 466–468. With 1 chart in text. [1 ref.]

Dognon has already noted that a rise in temperature from 15° to 35°C. almost doubles the sensibility of Ascaris eggs to X-rays. He now finds that this sensibility rapidly increases at higher temperatures—at 39° being three times, and 47°C. being five times greater than at 20°C.

T. W. M. C.

Asada (Junichi). **Studies on the Oral Infection with Ascaris. Communication I. On the Route of Transmigration in the Host's Body in Oral Infection.**]—*Tokyo Iji-Shinshi* (*Tokyo Med. News*). 1925. Oct. No. 2441. [Summarized in *Japan Med. World.* 1926. Jan. 15. Vol. 6. No. 1. pp. 11–12.]

Asada finds that the mature naturally hatched larvae of Ascaris can infect the host when swallowed. The larvae pass to the lungs either by way of the capillaries, portal vein and heart, or through the abdominal cavity and, by perforating the liver, reach the heart. He finds that the former is the common method. Once the lungs are reached, Asada states that they then follow the same regular course as in the cutaneous infection.

T. W. M. C.

Delvoie (Paul). Quelques méfaits des vers intestinaux. [**Some Accidents caused by Intestinal Helminths.**]—*Arch. Méd. Belges.* 1926. Jan. Vol. 79. No. 1. pp. 9–11. [1 ref.]

In discussing the " misdeeds " of helminths, Delvoie records an impaction from which he recovered 55 ascarids, 15 others being evacuated with the aid of santonin ; and a duodenal stenosis in a child of 12 caused by Ascarids.

R. T. L.

Pawan (J. L.). **A Case of Infection with *Lagocheilascaris minor* (Leiper).**—*Ann. Trop. Med. & Parasit.* 1926. June 24. Vol. 20. No. 2. pp. 201–202.

Pawan records an infection in a Trinidad youth with *Lagocheilascaris minor* in a tumour below the angle of the jaw. The tumour and right tonsil when removed both proved to contain specimens of the parasite.

T. W. M. C.

Hase (Albrecht). Kurzer Beitrag zur Frage der Bekämpfung der Oxyuriasis mit Oxylax. [**The Combating of Oxyuriasis with Oxylax.**]—*Muench. Med. Woch.* 1926. Jan. 29. Vol. 73. No. 5. p. 196. [5 refs.]

After long trial of the usual methods of treating Oxyuris infection in three members of one family, the mother and two children, the author gave Oxylax. This is made up in chocolate tablets and each contains 0·15 gm. of Tubera jalapae and 0·1 gm. of Dihydrooxyphtalophenon. On account of the taste of the vehicle children take the drug readily. The first dose led to the evacuation of several worms and the course was continued (one tablet daily) for about four weeks. All subjective symptoms disappeared, and repeated search since the termination of treatment has failed to reveal either worms or ova in any of the patients.

H. H. S.

Nebert (H.). Ueber die Oxyurenbehandlung mit Oxylax. [**Treatment of Oxyuriasis with Oxylax.**—*Deut. Med. Woch.* 1926. Feb. 5. Vol. 52. No. 6. pp. 240–241. [1 ref.]

A brief paper of further laudatory remarks on Oxylax in oxyuriasis [*ante*, p. 259]. A case is cited in which rapid cure resulted and the general condition passed from that of a weakly, anaemic child, irritable from disturbed sleep, to a healthy one, enjoying life to the full and sleeping well. The drug appears not only to be an effectual anthelmintic, but to have the additional advantages of requiring no preliminary dietetic restriction, nor any accompanying local application, such as lavage.

H. H. S.

Nishino (Tsunenori). [**Studies on Oxyuris. Communication II.**]—*Chiba Igakkwai Zasshi* (*Jl. Chiba Med. Soc.*) 1925. Feb. Vol. 3. No. 2. [Summarized in *Japan Med. World.* 1925. Dec. 15. Vol. 5. No. 12. p. 359.]

The writer deals with the migration in the digestive tract of the host, and the development of the species which occur in man and in rats. [No details are given in the summary.]

T. W. M. C.

Moses (Henry Monroe). **Trichinosis.**—*Long Island Med. Jl.* 1926. Jan. Vol. 20. No. 1. pp. 7–13. With 1 text fig. [16 refs.]

Moses describes the case of a Swedish sailor who died 23 days after admission to hospital suffering from inability to walk and pains in the muscles of the limbs, trunk, and mouth. A biopsy specimen from the gastrocnemius muscle showed the presence of Trichinella larvae. The leucocyte count gave 14,100–14,300 with an eosinophilia of 17 to

20 per cent. He points out that cases of Trichinella infestation may easily be diagnosed as typhoid fever, and quotes Boston and Chicago reports of 20 and 27 cases, respectively, so diagnosed in recent years.

R. T. L.

Bettison (William L.). **Trichinosis. Report of Four Cases, with Recovery, occurring in the University of Michigan Student Health Service.**—*Jl. Amer. Med. Assoc.* 1926. Feb. 27. Vol. 86. No. 9. pp. 609–613. With 6 text figs. [11 refs.]

Bettison reports four cases who contracted trichinosis from eating undercooked pork. Symptoms developed in two or three weeks and consisted of headache, oedema of the face and eyelids, muscular pain and fever (101°–105° F.) and sweating. Blood examination showed a marked eosinophilia (up to 39 per cent.) and a leucocyte count which varied from 3,600 to 30,000. The diagnosis was confirmed by microscopical examination of pieces of the gastrocnemius muscle. All recovered.

R. T. L.

Cheney (Garnett). **Sporadic Trichinosis with Extreme Hypotension.**—*Jl. Amer. Med. Assoc.* 1926. Apr. 3. Vol. 86. No. 14. p. 1004. [5 refs.]

Cheney records a case of trichinosis in San Francisco. There was at first no eosinophilia, but later this rose to 41 per cent. The muscles were tender on palpation. The case was unusual on account of the extreme hypotension observed. Diagnosis was made from a piece of excised pectoral muscle.

R. T. L.

Docherty (J. Frank). **Value of Hookworm Control of Ceylon Estates.**—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Nov. 18. Vol. 1. Pt. 3. pp. 111–120. With 6 charts. [2 refs.]

The majority of the planters in Ceylon are satisfied that systematic hookworm control results in a marvellous change in the health of the coolie. As accurate data concerning this improvement is seldom forthcoming, the author undertook a control demonstration on an estate in the North Matele District. The coolie population approximated 1,100: to all appearance the majority were fairly heavily infected, the children apparently suffering the most. The whole were treated with carbon tetrachloride according to the following table :—

A. *Dosage.*
- 2–18 years twice age in mins.
- 18–40 ,, 40–45 mins.
- 40–50 ,, 30–40 mins.
- 50–55 ,, 20–30 mins.

B. *Exemptions.*
1. All below 2 and over 55 years of age.
2. Pregnant but not nursing mothers.
3. Alcoholics who had imbibed within 48 hours of treatment.
4. Epileptics and all hospital cases.

C. *Precautions.*
1. No food on the morning of treatment.
2. A post purge of Epsom salts 2 hours after treatment.
3. A minimum treatment interval of ten days.
4. No food until 2 hours after Epsom salts had been administered.
5. A second purge if bowels had not moved in 6 hours.

Later chenopodium was used for children under 10 years of age. The average monthly rate of reinfection was 1·66 per cent. of original infection where a fair amount of soil pollution existed in spite of adequate sanitation. Although practically the entire labour force was found reinfected within a year the infection was considered to be very light, the average coolie acquiring in twelve months 20 per cent. of his original infection.

R. T. L.

Docherty (J. Frank). **Hookworm Infestation and Reinfestation in Ceylon. A Study of High Incidence with a Moderate Degree of Infestation.**—*Amer. Jl. Hyg.* 1926. Mar. Supp. Vol. 6. pp. 160–171. With 3 charts in text. [4 refs.]

Docherty analyses over 20,000 egg counts (for Necator) made in Ceylon with a Stoll technique and concludes that there is only a moderate grade of infection in the areas considered and that there is a marked tendency for infection to re-establish itself following treatment on the intensive system. He believes that repeated mass treatments at definite intervals are necessary since, irrespective of the number of treatments received, the average villager in 33 months has re-acquired an infection of about 67 per cent. of his untreated neighbours.

T. W. M. C.

Sweet (W. C.). **Hookworm Re-Infection. An Analysis of 8,239 Ceylon Egg-Counts.**—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Nov. 18. Vol. 1. Pt. 3. pp. 129–140. With 1 fig. [3 refs.]

In 1924 the "Ceylon Anchylostomiasis Campaign" began work on an island-wide survey to determine hookworm infection rates by means of Stoll's egg-count method on faecal specimens collected from available representative groups of the population. From the analysis of 8,239 Stoll egg-counts, it was found that previously treated persons had a considerably lower infection intensity than untreated persons, the reduction being greatest in the children's groups. Reinfection was most rapid in the first three years following treatment, between the 3rd and 7th years it remained at a level, and then began to rise again. It is suggested that the average length of life of the adult worm is between 3 and 5 years. While the importance of sanitation is upheld it is argued that the impossibility of introducing adequate sanitation immediately is no bar to the eventual accomplishment of hookworm control.

R. T. L.

Chandler (Asa C.). **Some Factors affecting the Propagation of Hookworm Infections in the Asansol Mining Settlement, with Special Reference to the Part played by Cockroaches in Mines.** *Indian Med. Gaz.* 1926. May. Vol. 61. No. 5. pp. 209–212. [3 refs.]

Chandler finds that the surface infection of soil with hookworm larvae in Asansol Settlement is almost stopped by desiccation for six months

of the year, and in consequence hookworm infection is relatively light. In the mines where this factor does not operate, and the conditions are favourable, owing to the feeding habits of the cockroaches, which rapidly destroy the stool and with it the eggs, infection is also light. In regular defaecation places where the cockroaches are not entirely able to cope with the faecal output, the infection is higher

T. W. M. C.

Korke (Vishnu T.). **Observations on Ankylostomiasis in some Areas in British India.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 493–523. With 1 text fig. and 12 figs. on 7 plates. [8 refs.]

Korke counted eggs by means of the Stoll technique, and isolated larvae by a modified Baermann technique. He found Necator was very prevalent in the Singhbhum area, the other common parasites being Ascaris, Strongyloides and Oxyuris. In the Puri and Cuttack areas hookworm was also common, while a considerable number of Strongyloides cases were also found.

T. W. M. C.

Covell (G.). **Ankylostomiasis among the Troops in Dehra Dun.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 539–546. [5 refs.]

Using the Lane "D.C.F." technique, Covell finds that 83 per cent. of the troops in the Dehra Dun are infected with hookworm, 16 per cent. with whipworms and 47 per cent. with Taenia. The infection with hookworm among the Gurkhas was especially high (92·9 per cent.).

T. W. M. C.

Soper (Fred L.). Notas sobre la distribucion geografica de la uncinaria en el Paraguay. [**The Geographical Distribution of Uncinariasis in Paraguay.**]—*Rev. Soc. Cientifica d. Paraguay.* 1924. Oct. Vol. 1. No. 6. pp. 81–82. With 1 fig.

136 individuals (soldiers and prisoners) from various parts of the State of Paraguay who were examined for hookworm were classified into two groups, viz., those from the area where an anti-hookworm campaign had previously been conducted and those from the remaining regions. The results of the investigation show that in the former group the average number of *Necator americanus* recovered was 449·6, in the latter group 378·2, and the average for *Ancylostoma duodenale* was 39·8 and 19·3 respectively, i.e., the relation between Necators and Ancylostomas being in Zone A 11·3 to 1 and in Zone B 19·6 to 1. The explanation of the reduction in the relative numbers is explained as due to the well-known fact that Necators are less resistant to anthelmintics than Ancylostomas.

R. T. L.

Cardosa (Carlos Arturo). Informe narrativo de clausura del laboratorio de uncinariasis, establecido en Garagoa el 20 de julio de 1923. [**Report of the Uncinariasis Laboratory, Garagoa, Colombia.**]—*Repert Med. y Cirug.* Bogota. 1924. Mar. Vol. 15. No. 6. (No. 174). pp. 316–327.

This reports the treatment for hookworm of all inhabitants *en masse* without previous microscopical examination, the whole population or

at least the majority where anaemia is endemic being considered to be suffering from hookworm. Over 20,000 persons were treated without untoward incident and the campaign is considered to have proved of great benefit, especially to the poorer classes who hitherto had not received any medical care.

R. T. L.

Vaccarezza (Raúl F.). La anquilostomosis en la República Argentina. [**Ankylostomiasis in the Argentine Republic.** With Appendix.] — *Semana Medica.* 1924. No. 21. 135 pp. With 5 figs. [54 refs.]

Ancylostomiasis is widely spread in the north of the Argentine Republic, particularly in the province of Corrientes and in the governments of Chaco, Formosa and Missiones. Isolated autochtonous cases of ancylostomiasis or necatoriasis have been observed in the Federal Capital as well as in all other provinces.

Forty per cent. of the persons examined (these being natives of the province of Corrientes and of the government of Missiones, who were incorporated in Army and Navy and were in apparently good state of health) have, from a simple coprological examination, been found to be carriers.

All this country is more or less contaminated with ancylostomiasis. In some localities of the province of Corrientes and the neighbouring governments the endemic index is so high, that practically all their inhabitants should be considered as infected.

The intensity of infestation, deduced from the lowest parasitic index obtained with the cases mentioned above, amounts to 110 per individual.

The affection is very often met with in childhood, and reaches the highest degree of frequency in adolescence. It is commonly to be found in adults in an attenuated form, and generally passes unnoticed, until a microscopical examination of faeces reveals the presence of the parasite. Grave cases have been observed especially among infants.

In the blood there is a more or less marked anaemia with predominant oligochromemia and manifest eosinophilia; frequently there is a slight hyperleucocytosis also.

Necator americanus occurred habitually in patients examined by the author, associated with some frequency with Whipworm and other intestinal helminths.

Carbon tetrachloride is the treatment of choice. In case of contra-indication, such as with alcoholics and hepatic insufficiency, or by partial failure (persistence of the ova after two treatments), one must fall back upon essential oil of chenopodium or its active principle, ascaridol. The latter should be administered jointly with the former, in intestinal polyhelminthiasis.

The chenopodium oil was, in routine, administered in doses of 0·60 3·60 cc. for adults. Doses lower than 1 cc. were used only in initial cases, or on first administration, the average dose then being 1·1·80 cc. Children have been given two drops of the officinal chenopodium oil (with 60 per cent. of ascaridol) for every year of age. It has been usually given on an empty stomach, twice, with an interval of an hour between each dose; afterwards a purgative of magn. sulph. and a consecutive milk-diet was prescribed. This treatment was repeated with an interval of 8-10 days until no eggs could be found in the faeces.

The treatment *en masse* of the infected population and the sanitation of the soil by means of the obligatory construction of closets are fundamental.

The use of footwear is an important auxiliary and the hygienic enlightment of the population a necessary complement.

R. T. L.

Warren (Andrew J.) & Carr (Henry P.). Incidencia de la uncinariasis en Mexico. [**Incidence of Uncinariasis in Mexico.**]—Reprinted from *Bol. d. Departamento de Salubridad Publica.* Mexico, D.F. 1925. No. 3. 84 pp. With 18 charts. [16 refs.]

This is an account of an investigation into the prevalence and effect of hookworm infestation in various districts of Mexico, carried out between May, 1924 and January, 1925. The ends aimed at were: (1). The geographical distribution of infestation according to elevation, temperature, rainfall, and type of soil. (2). The distribution and severity in correlation with age, sex, race, locality, and occupation. (3). The source of infestation with a view to formulating preventive measures. (4). The effects on the individual.

The technique employed is detailed, and was on the usual lines; the presence or absence of ova in the faeces by Willis's method; the absolute number per gramme of faeces by Stoll's method; the haemoglobin percentage by Dare's instrument. A considerable part of the report is taken up by a discussion of the values of the methods used. A standard was determined upon by which those with less than 700 ova per gramme were regarded as harbouring 25–30 worms, and as being "hookworm carriers" but not suffering from Uncinariasis. The table of degree of infestation and the reduction of haemoglobin shows the correlation between the two in the authors' cases, and was astonishingly graded, results at variance with those obtained in other investigations. Various districts are dealt with *seriatim* with details giving the incidence and severity. Of 4,604 worms determined, 4,246 were *Necator*, nearly equally distributed in sex, namely 2,226 males and 2,020 females. 358 were *Ancylostomas*, 223 males and 135 females. There were, therefore, 7·7 per cent. of the latter to 92·3 per cent. of the former. The percentage of infection in different places is calculated on too small numbers to convey any useful information. Thus it is stated that in Cordoba 100 per cent. of adult males were infected, but, on referring to another column, we find that only one was examined. The same occurs elsewhere; in fact, in 17 instances in this table alone, treating of the "Percentage of Uncinariasis in Mexico," these figures are calculated on numbers less than 10.

H. H. S.

Cort (William W.). **Investigations on the Control of Hookworm Disease. XXXIV. General Summary of Results.**—*Amer. Jl. Hyg.* 1925. Jan. Vol. 5. No. 1. pp. 49–89.

This, the 34th paper, marks the close of the series of publications on the hookworm investigations carried out by the staff of the Department of Medical Zoology of the School of Hygiene and Public Health, Baltimore, and summarizes the results obtained. In this *Bulletin* the various

sections have already been abstracted as they appeared, but those desirous of an authoritative summary of the important and in some respects unique and unexpected results obtained should read the present paper by the senior author, who emphasizes again the point that the work has served to open up the problems and to illustrate the complexity of the factors involved in the epidemiology and etiology of hookworm disease as well as to give an explanation and indicate a solution of these problems.

R. T. L.

DARLING (Samuel T.). **Comparative Helminthology as an Aid in the Solution of Ethnological Problems.**—*Amer. Jl. Trop. Med.* 1925. Sept. Vol. 5. No. 5. pp. 323–337. [1 ref.]

In this fascinating address, composed on board ship when bound for the Holy Land, where he lost his life in a motor accident, the late Dr. Darling, of the International Health Board, explores the possibility that comparative helminthology may come to the aid of paleontologists and comparative anatomists in elucidating the subject of man's origin and migrations. A study of the species of hookworms harboured by man in divers places gives suggestive results. There can hardly be any question but that the distribution of the two species of hookworms of man does not depend on climate and soil, but is due to the migration of the hosts which harbour them. In an analysis of worm counts it has been found that mixed forms tend to be found when there is known to have been mixtures of two or more ethnic stocks. Moreover, pure cultures tend to be found in certain geographical areas as well as in ethnic stocks. *A. duodenale* is found in pure culture in Egypt and in Europe, *N. americanus* in Kaffirs in South Africa and in negroes in the southern United States, and also amongst Solomon Islanders and Polynesians. Mixed cultures are more commonly found than pure cultures, and this might be expected as a result of the migration of peoples and the mixtures of races which have taken place even within historic times. Yet one or other species tends to predominate more or less markedly in certain areas where mixture of races occurs in unequal proportion; e.g., in Java, Malays carrying especially Necator occur alongside North Indian stock which has come to the island within recorded times. In India, the population from which it was derived carries a higher proportion of *A. duodenale*, and in Java, where there is a large proportion of this Indian stock, there is a higher proportion of this hookworm than in other parts of the island where the stock is absent. Similar examples occur in Fiji, Brazil and Jamaica.

From these observations the author draws the conclusions that two races of anthropoids arose in geographical areas widely separated by water, and were in the first instance infested with different species of hookworm. That in the Holarctic region harboured *A. duodenale*, while the other, the primitive dark-skinned race which arose in the Ethiopian-Oriental zone, harboured *Necator americanus*. The absence of Necator from Egypt and Europe is an indication that there has been no intrusion of negroid stocks into these countries in spite of the Roman conquests and the influx of conquered peoples into Egypt, Greece and Rome. The dark-skinned inhabitants of the Mediterranean basin are a distinct race not of negroid origin.

R. T. L.

Smillie (W. G.) & Augustine (D. L.). **Hookworm Infestation. The Effect of Varying Intensities on the Physical Condition of School Children.**—*Amer. Jl. Dis. Children.* 1926. Feb. Vol. 31. No. 2. pp. 151–168. With 3 charts in text. [9 refs.]

Smillie and Augustine point out that American workers distinguish between light infections with hookworms (carriers) and heavy infections (hookworm disease), whereas others hold that every case must be considered as disease. The latter idea requires better methods of diagnosis and improved treatment, whereas the former demands some method of measuring the degree of infestation. They believe that some confusion has been caused by the use of the word "Hookworm," which includes two parasites. Infections with *Ancylostoma* are much more severe than those with *Necator*. The present paper deals only with *Necator* in the southern United States. Ova counts were made by the Stoll technique, and children were divided into six groups, based on the number of hookworms calculated to be present as follows: negative, very light (1–25), light (26–100), moderate (101–500), heavy (501–1,000) and very heavy (1,001–3,000). They find that although moderate infections cause less injury than do heavy, yet they cause appreciable damage. No ill effects were seen either in measurements or in haemoglobin in children with under 100 parasites. A typical clinical picture is seen only when over 500 worms are present. They consider that drugs need only be employed when over 100 worms are present, while for the carrier stage (under 100) sanitation and education can be relied upon for control.

T. W. M. C.

Smillie (W. G.) & Augustine (D. L.). **The Effect of Varying Intensities of Hookworm Infestation upon the Development of School Children.**—*Southern Med. Jl.* 1926. Jan. Vol. 19. No. 1. pp. 19–28. With 4 charts in text. [5 refs.]

This is a second study on the subject and is based on an analysis of the improvement in height, weight, vital capacity, haemoglobin, etc., of 568 school-children three months after treatment for hookworm infestation of different degrees of intensity. With the exception of the haemoglobin it is obvious that improvement within so short a period as three months is a very difficult matter to measure or evaluate. *Necator americanus* was the only hookworm found, and the fact that this causes less severe injury than *Ancylostoma* makes the estimation of improvement even more difficult. The authors conclude that a definite gain in height, weight, and haemoglobin percentage occurs in children who have harboured 100 worms or more, after their removal. Those with less than 100, but more than 25, improve as regards the haemoglobin only, the other factors being unaffected, at least to any recognizable extent. Those with less than 25 show no change, thus lending support to the importance of distinguishing the "hookworm carrier" from those suffering from "hookworm disease."

H. H. S.

Wilson (D. B.). Calculo del número de gusanos por el método de Stoll. [**Enumeration of Worms by Stoll's Method.**]—*Repert. Med. y Cirug.* Bogota. 1925. Apr. Vol. 16. No. 7. (187). pp. 301–303.

The author, who is Director of the Department of Uncinariasis in the International Council of Sanitation at Bogota, has applied Stoll's

method to a series of cases of hookworm at Chicoral in Espinal. In 99 patients there were approximately 11,642, or an infestation of 118 worms per person. In 41 female patients he calculated that there were 3,350 hookworms, i.e., 82 per person. The 58 males in the series gave 8,292 worms, or 145 per person according to the method of calculation. The occupation of a large percentage of the men was not ascertained, but some of them were employed in the country. A number wore "alpargatas" [these are canvas shoes with cord soles]. One patient who had, according to calculation, 1,020 worms, travelled two days to reach the laboratory, and had received two months before a course of thymol in unknown doses from a local pharmacy. At the first evacuation after treatment the individual expelled 150 Necators, but could not be persuaded to remain longer to enable the total number of worms harboured to be ascertained. In the neighbouring village of Melgar, the worm count in 17 patients gave an average of 138 worms, although these lived under conditions identical with those examined by Stoll's method. The worm count in this group, however, was made after treatment with carbon tetrachloride. The average in this group reached just over 20 per patient more than was calculated in a similar group by Stoll's method.

R. T. L.

Chandler (Asa C.). **The Rate of Loss of Hookworms in the Absence of Re-Infections.**—*Indian Jl. Med. Res.* 1926. Jan. Vol. 13. No. 3. pp. 625–634. With 2 charts in text. [12 refs.]

Chandler has examined the faeces of over 900 prisoners in Alipore jail, and, using the number of eggs found with a modified Stoll technique as a criterion, finds that 50 per cent. of the original infection is lost within three months, 70 per cent. in a year, 80 per cent. in two years, 90 per cent. in four years and 93 per cent. in six years. Slight infections were, however, found in prisoners up to 20 years, but he is not absolutely certain that all chances of re-infection have been excluded.

T. W. M. C.

Augustine (Donald L.) & Smillie (Wilson G.). **The Relation of the Type of Soils of Alabama to the Distribution of Hookworm Disease.**—*Amer. Jl. Hyg.* 1926. Mar. Supp. Vol. 6. pp. 36–62. With 3 charts and 1 map in text. [15 refs.]

Augustine and Smillie find that, other factors favourable for development being equal, the development of hookworm larvae depends on the physical texture of the soil, the largest number developing in sandy soil and the smallest in clay. The incidence of infection is greatest in sandy districts, and they suggest that experiments similar to theirs should be made locally by health officers within the hookworm belt, to test whether the soil is suitable or not for the development of the larvae.

T. W. M. C.

Augustine (Donald L.). **Studies and Observations on Soil Infestation with Hookworm in Southern Alabama from October 1923 to September 1924.**—*Amer. Jl. Hyg.* 1926. Mar. Supp. Vol. 6. pp. 63–79. [6 refs.]

While the natural mortality among hookworm larvae is normally high, Augustine was unable to find any infective larvae from the end of

December to the end of February in polluted soils, owing to the low local temperature. Dry periods during spring and summer also checked development entirely in sandy soils.

T. W. M. C.

CHANDLER (Asa C.). **Soil Acidity and Survival of Hookworm Larvae.**—*Indian Med. Gaz.* 1925. Oct. Vol. 60. No. 10. pp. 462–464. [1 ref.]

HIRST (L. Fabian). **Soil Acidity and Survival of Hookworm Larvae. A Critical Commentary.**—*Ibid.* 1926. Jan. Vol. 61. No. 1. pp. 14–17. [7 refs.]

CHANDLER (Asa C.). **Soil Acidity and Survival of Hookworm Larvae. A Reply to Dr. HIRST'S Critical Commentary.**—*Ibid.* pp. 17–18.

Chandler finds that the acidity in normal soil—at least up to a pH value of 5·5—does not interfere with the survival of hookworm larvae; and he criticizes a statement by HIRST (this *Bulletin*, Vol. 21, p. 968) that "a markedly acid reaction is also most unfavourable to the continued survival of hookworm larvae."

Hirst points out that CHANDLER is obviously referring to infective larvae, whereas he was referring to larvae in the pre-infective stage as well. He believes that pot experiments cannot present the true maximum of longevity of hookworm larvae, owing to the essential introduction of artificial procedures. Length of life depends mainly on good cultivation, and delicate larvae would survive only for a short time.

Chandler agrees with HIRST. He had considered the development and the survival of larvae as separate problems. He considers that these experiments can only be properly carried out by exposing the stool to the natural influence of beetles, etc., on specially selected ground.

T. W. M. C.

CHANDLER (Asa C.). **The Pathogenic Effects of Helminthic Infections.**—*Indian Med. Gaz.* 1926. Apr. Vol. 61. No. 4. pp. 157–158. [7 refs.]

Discussing the clinical effects of light hookworm infestations, Chandler was unable to find any alteration in haemoglobin in Indians, but he concludes that sufficient data are not yet available definitely to decide the point.

T. W. M. C.

FÜLLEBORN (F.). Eine Methode zur Isolierung von Hakenwurm- und anderen thermotaktischen Larven aus Gemischen mit freilebenden Erdnematoden. [**A Method for the Isolation of Hookworm and other Thermotactic Larvae from Mixtures of Free-Living Nematodes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Oct. 15. Vol. 29. No. 10. pp. 470–478. With 5 text figs. [14 refs.]

The author comments on the difficulty of separating hookworm larvae from free-living nematodes in extracts of soil, faeces mixtures made by the Baermann method, particularly if the larvae have broken out of their sheaths.

After numerous experiments he arrived at a useful device, which is made as follows.

A hollow wire gauze cylinder of very fine mesh (about 120 to the inch) is constructed, about 5 cm. in diameter with a bottom of the same material,

and is sewn together with thread. It is placed in a Petri dish and melted agar is poured into it to a depth of about 3 mm., so that when cold the bottom will be covered with a layer of agar of this depth. Whilst the agar is still fluid, a paper ring, the edges of which have been gummed together, and about 4 cm. in height, is placed inside the gauze cylinder ; the bottom edge of the paper resting on the bottom of the structure. The melted agar penetrates the paper by being gently shaken to and fro. The agar layer must not be more than 3 mm. deep. He uses a 1·5 per cent. agar medium diluted so as to give a 0·75–0·5 per cent. strength for providing the agar layer. When this is cold, a layer of fine sand is sieved on to the surface of the agar to a depth of 3 mm. Water containing larvae and free-living nematodes in suspension is then poured on to the sand to a height of not more than 1 cm., and must not be too high ; on the other hand, the sand must remain covered with water. The apparatus is then placed in a Petri dish with its edges resting on two narrow strips of glass, about 1·5 mm thick, lying on the bottom of the dish. From 2–3 ccm. of water are put into the dish in contact with the lower surface of the agar. For ensuring the requisite heating, the apparatus is placed on a water bath consisting of two large glass dishes one inverted inside the other, the lower one containing water and resting on a copper plate, which is heated below by a small flame. By heating the water in the bath to 55°–60° C. the water inside the wire gauze cylinder on the sand will be raised from room temperature to about 38° C. in from 15 to 20 minutes, and the water in the Petri dish in contact with the lower surface of the agar will have reached about 45° C. After cooling for 15–20 minutes, the apparatus may be heated again. By this means the hookworm and Strongyloides larvae can be collected in a small quantity of water below the agar, after twice, or even sometimes only once, warming the apparatus, whilst the free-living nematodes are unable to penetrate the agar layer.

R. T. L.

Chandler (Asa C.). **Notes on some Methods for Diagnosis of Hookworm Infection and for estimating the Egg Output.**—*Indian Med. Gaz.* 1925. Sept. Vol. 60. No. 9. pp. 403–406. [7 refs.]

After comparing several methods in use for the recovery of hookworm ova from stools, Chandler concludes that the substitution of Lane's " D.C.F." technique for the Stoll technique is impracticable mainly on account of the extra labour involved in counting the large number of ova. The dilution technique he finds to be as accurate as Lane's, and much less troublesome to count.

T. W. M. C.

Caldwell (Fred C.) & Caldwell (Elfreda L.). **A Dilution-Flotation Technic for Counting Hookworm Ova in Field Surveys.**—*Amer. Jl. Hyg.* 1926. Mar. Supp. Vol. 6. pp. 146–159. [8 refs.]

Caldwell and Caldwell have developed a dilution flotation technique for the detection of hookworm eggs in which they use antiformin (to dissolve the mucus) and sugar solution (to retard movement of ova, increase viscosity, and so make a more homogenous suspension ; this material is also more easily obtained in the tropics than many other materials—including salt). The steps of the technique are as follows :

1. Weigh, by difference, 4 gms. of stirred faeces into a 40 mil. tube.
2. Add 4 mils. of antiformin, stir with a glass rod and set aside for an hour.
3. Add sugar solution (sp. gr. about 1·230) to the 40 mil. mark.
4. Stir, remove rod, and secure suspension by bubbling through a bacteriological pipette.

5. Remove with the pipette, ·1 mil. of the suspension.
6. Count the ova in this ·1 mil. and multiply by 100, to obtain the ova per gram.

Two or more counts are made, but they consider that only one is necessary to classify individuals in intensity groups.

T. W. M. C.

Stoll (Norman R.) & Hausheer (Walter C.). **Accuracy in the Dilution Egg Counting Method.**—*Amer. Jl. Hyg.* 1926. Mar. Suppl. Vol. 6. pp. 80–133. With 3 text figs. [22 refs.]

Stoll and Hausheer have made an exhaustive series of tests with the former's dilution technique and the Lane technique for the isolation of hookworm eggs. They find that they secure higher average counts with the dilution technique and they re-affirm their belief that it is accurate to within 10 per cent. of the absolute number of eggs present The shortcomings of the "D.C.F." technique are criticized and analysed.

T. W. M. C.

Stoll (Norman R.) & Hausheer (Walter C.). **Concerning Two Options in Dilution Egg Counting: Small Drop and Displacement.**—*Amer. Jl. Hyg.* 1926. Mar. Supp. Vol. 6. pp. 134–145. With 1 text fig. [6 refs.]

Stoll's original technique is modified by (*a*) using 75 cmm. drops instead of 150 cmm. drops of the suspension for counting and either multiplying each count by 200, or adding two together and multiplying by 100; and (*b*) by using a measured quantity of faeces instead of a weighed sample. The apparatus used is a 50 cc. Erlenmeyer flask, with a long neck, on which are marked 56 and 60 cc. marks. The flask is filled to the lower level with N-10 sodium hydroxide solution, and faeces added until the level of the fluid reaches the upper mark. Glass beads are added and a rubber stopper is used. The mixture is comminuted. Counts by this method should be recorded as eggs per cc. rather than as eggs per gramme.

T. W. M. C.

Yokogawa (S.) & Oiso (T.). **Investigation on the Life-History of Ankylostoma and Strongyloides IV.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1926. Jan. No. 250. English summary pp. 5–6. [In Japanese.]

Continuing their series of experiments on the life histories of Ancylostoma and Strongyloides (this *Bulletin*, Vol. 22, p. 891, and Vol. 23, p. 269) the writers have compared the resistance to gastric juice of mature hookworm larvae before and after the passage through the lungs of the proper host and other animals, and find that the resistance of the latter is less than the former. They find also that the larvae do not possess any special properties after passage through the lungs, and that if fed to a second host they will migrate in the body of this animal also. They conclude that when mature hookworm larvae are fed to the proper host they will develop directly in the intestine, but that if fed to an unsuitable host they will attempt to escape from the unsuitable environment, and, following the line of least resistance, are carried to the lungs.

T. W. M. C.

VAN THIEL (P. H.). Verdere onderzoekingen omtrent de differentieeldiagnose van de strongyloïde larven van *Necator americanus* en *Anchylostoma caninum*. [**Further Research on the Differential Diagnosis between the Strongyloid Larvae of *Necator americanus* and *Anchylostoma caninum*.**] – *Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 1. pp. 14–23. With 1 plate. [9 refs.]

The following points for differential diagnosis between human and canine hookworm larvae may be of practical value in the study of soil infestation :

1. The rostral part of the chitinous wall of the oral cavity (pharynx) is vase shaped in *Necator americanus*, much thinner (with some thickening on the dorsal side) in *Ancylostoma caninum*.

2. The transverse striae of the cuticule are much more pronounced in *Necator americanus* larvae than in those of *Ancylostoma caninum*.

3. The outline of the caudal bulbus of the oesophagus in Necator shows irregularities caused by glands embedded in the muscular wall. Such irregularities are absent in *Ancylostoma caninum*.

4. Behind the junction with the oesophagus, the intestine immediately appears as a wide tube in Necator, much narrower in *Ancylostoma caninum*.

5 (erroneously 6 in text). The tail of Necator is much longer (about 1/5 of the total length) and sharper than that of *Ancylostoma caninum* (1/6 or less of the total length).

W. J. Bais.

MAPLESTONE (P. A.). **Observations on the Development of Hookworm Larvae. Parts I and II.** *Ann. Trop. Med. & Parasit.* 1926. Feb. 11 & June 24. Vol. 20. Nos. 1 & 2. pp. 49–58. [7 refs.] ; pp. 167–173. [2 refs.]

It has been stated that salt has an adverse influence on hookworm eggs and larvae. Using artificial cultures (mainly of Necator) Maplestone finds that sea sand and water have no effect on the development of the eggs and larvae.

Continuing the series of experiments, Maplestone finds that urine has a definite destructive effect on eggs and newly hatched larvae. After four days' complete immersion in water, 25 per cent. of the eggs were destroyed and the number of viable eggs decreased as the time increased.

T. W. M. C.

BISHOP (H.). **Notes on the Use of Carbon Tetrachloride (CCl_4) in Trinidad and Tobago.** *Jl. Port-of-Spain Med. Soc.* 1924. pp. 21–24.

Bishop used carbon tetrachloride in over 25,000 cases of hookworm infection in Trinidad and Tobago. No preliminary purge was given, but patients were enjoined to abstain from alcohol and take sugary food for 24 hours prior. A light meal was allowed at 6 a.m., and the drug given between 7 and 8 a.m., followed in an hour by Epsom salts. Ascarid infection was treated with chenopodium alone or with carbon tetrachloride. Only 12 cases of illness were noted—chiefly after chenopodium. He finds carbon tetrachloride less disagreeable than chenopodium and more effective against hookworm.

R. T. L.

Hausheer (W. C.). **Recent Methods in the Diagnosis and Treatment of Ankylostomiasis.**— *Jl. Port-of-Spain Med. Soc.* 1924. pp. 4–18. With 1 plate. [10 refs.]

Hausheer discusses the value of carbon tetrachloride as an anthelmintic and its use in Trinidad. 2 cc. in a hard gelatin capsule are given followed within an hour by 2 oz. of magnesium sulphate. Children under ten years are not treated. Ascaris cases were given chenopodium. He found that in a test series of 1,000 cases there were nearly 90 per cent. of cures after two doses of carbon tetrachloride, compared with 53 per cent. after two doses of chenopodium.

R. T. L.

Kingsbury (A. Neave). **On the Carbon Tetrachloride Treatment of Ankylostomiasis with a Note on the Hookworms of Penang.**— *Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Jan. 21. Vol. 19. No. 7. pp. 397–404. [7 refs.] also in *Jl. Trop. Med. & Hyg.* 1926. May 1. Vol. 29. No. 9. pp. 139–142.

Carbon tetrachloride has been used in 143 cases of hookworm infection in Penang. The percentage of worms expelled following the first treatment was 84 per cent.—Necator being more easily expelled than Ancylostoma. Five cases died subsequently from other causes. About 30 per cent. of the cases complained of nausea, thirst or of a burning sensation in the epigastric region. In a few cases a transient nephritis was observed, and in one a temporary albuminuria.

R. T. L.

Insfrán (José V.). **Treatment of Hookworm Disease in Pregnant Women with Carbon Tetrachloride.**— *Jl. Amer. Med. Assoc.* 1926. Mar. 13. Vol. 86. No. 11. pp. 735–736. [4 refs.]

Insfrán finds that carbon tetrachloride—on the basis of 225 women treated—may be given to pregnant women without untoward results.

T. W. M. C.

Castro (Mendonça). O tetrachloreto de carbono no tratamento da uncinariose. [**Carbon Tetrachloride in the Treatment of Ancylostomiasis.**]—*Arch. Brasileiros de Med.* 1924. Mar. Vol. 14. No. 3. pp. 211–223. [10 refs.]

It is stated that carbon tetrachloride does not deteriorate. It has many advantages over chenopodium, being palatable and causing no depression. It can be taken without a purgative. It acts on the liver by stimulating the biliary secretion. There is a hypersecretion of mucus in the bowel. Sometimes the drug causes abdominal pain. The symptoms of toxicity are few: vertigo, slight nausea, cephalalgia, somnolence, and usually transitory in character. Deaths occur, however, from a large dose, from impurity of the drug, and in these cases the liver at autopsy showed marked changes. It is recommended that no saline purge be given immediately after the drug as this appears markedly to increase its irritant action on the intestinal mucosa. For children, chenopodium and carbon tetrachloride can be mixed, thus

securing the expulsion of *Ascaris lumbricoides*. In default of capsules carbon tetrachloride may be given in water. Alcoholics and those with heart, liver or kidney disease and cases of infectious diseases with acute intestinal symptoms should not be treated. Any treatment by this drug should precede an administration of chloroform for anaesthesia by several days.

R. T. L.

Khalil (M.). **Note on the Toxicity of Carbon Tetrachloride in the Treatment of Ankylostomiasis.** —*Lancet.* 1926. Mar. 13. pp. 547–548. [3 refs.]

Khalil finds that some samples of " pure " carbon tetrachloride are toxic to laboratory animals, and he believes that this is due to sulphur compounds which distil at temperatures under 76° C. Carbon bisulphide was added to carbon tetrachloride without ill effects to laboratory animals (including monkeys), but the actual sulphur compounds which make the pure drug toxic have not yet been found. It has been found possible to eliminate them, however, by fractional distillation and discarding the first 1 per cent. distilled over. Using 5 cc. doses of the drug, thus treated, over 150,000 cases have been treated with only one fatal case—an old man addicted to opium and alcohol. Khalil finds that 5 cc. is the most effective dose for *Ancylostoma duodenale*.

T. W. M. C.

Manalang (C.). **Ankylostomiasis : Comparative Efficiency of Carbon Tetrachloride, Chenopodium and Thymol in the Treatment of Hookworm Infection.**—*Jl. Trop. Med. & Hyg.* 1926. Apr. 1. Vol. 29. No. 7. pp. 101–103.

Manalang has tested the relative value of carbon tetrachloride, chenopodium and thymol against hookworm, and finds that the first (1 cc. per 7 kg. body weight) removed 95·2 per cent. of ancylostomes and 98·8 per cent. of necators at the first treatment, chenopodium 72 and 91 per cent. respectively, and thymol 64·3 and 74·8 per cent. Carbon tetrachloride is also more rapid in its action.

T. W. M. C.

Sweet (W. C.). **The Treatment of Hookworm and Ascaris Infections with Carbon Tetrachloride and Oil of Chenopodium.**—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Nov. 18. Vol. 1. Pt. 3. pp. 121–128. [2 refs.]

In a country like Ceylon, where infection with *Ascaris lumbricoides* is general, the comparative failure of carbon tetrachloride to remove these worms is stated to be a serious drawback. A combination with oil of chenopodium would be ideal for field work, and the simultaneous administration of the dose of sulphate of magnesium would further enhance the value of the combination by saving in time and money. With these aspects of the problem in mind, the author carried out a series of tests in the Boganbara Jail, Kandy, Ceylon. The results are set out in detail showing that the most efficient combination for removing hookworms was carbon tetrachloride and oil of chenopodium in a ratio of 3 to 1 given in a solution of mag. sulph. for a purge. The giving of salts with the anthelmintic apparently delayed the expulsion

of the majority of the worms of both kinds until the second day after treatment but increased the efficiency of the test in removing the hookworms.

R. T. L.

Pessôa (Samuel Barnsley). Estudo dos componentes do oleo essencial de chenopodio. Sua applicação na prophylaxia da ancylostomose. [**The Components of the Essential Oil of Chenopodium. Prophylaxis of Ancylostomiasis.**] 2a Edição.—*Instituto de Hygiene.* S. Paulo. Bol. N. 13. 71 pp. [50 refs.]

The essential oil of chenopodium is composed of a mixture of (*a*) Terpenes, some of which are already identified as the terpinene and paracymene as well as of another, not yet identified, in the proportion of 20-30 per cent.; (*b*) Traces of fatty acids, traces of salicylic acid and of 0·5 per cent. methyl salicylate; (*c*) About 50-70 per-cent. of ascaridol, an organic peroxide of the formula $C_{10}H_{16}O_2$; (*d*) Small portions of an isomer of ascaridol, the glycol anhydride or its corresponding hydrate.

The terpenes do not possess any vermicidal property. The author has never observed any toxic symptoms due to them either in animals or man.

The methyl salicylate, even in doses of 2 cc. for adults, induced neither vermicidal nor toxic effects. The isomer of ascaridol as well as the glycol hydrate also do not reveal perceptible vermicidal effect. These latter are toxic in animals only in large doses (1 cc. per kilo.); in man, the maximum dose of 1·5 cc. produces slight symptoms of intoxication.

Ascaridol is a strong vermifuge. Administered as indicated by the author, 1 cc. ascaridol expels about 95 per cent. of the hookworms. It has toxic effects upon dogs, causing their death in doses of 0·10-0·20 cc. per kilo. In man, 1·5 cc. of ascaridol produces toxic symptoms equivalent to those produced by 2 cc. of ol. chenopodii. The toxic symptoms determined by ascaridol are similar to those following the administration of chenopodic oil.

The optimum dose of ascaridol is 1 cc. given at one time in a solid gelatine capsule. It should be administered in the morning, on an empty stomach; a preliminary purgative is not necessary. A saline purgative should be administered half an hour after the capsule has been given.

The dose for children up to 5 years is 1-2 drops of ascaridol in an emulsion of 10-20 cc. of castor oil; for those of 6 to 15 years, for each year of age 1 drop (in a gelatine capsule), followed half an hour later by a saline purge, e.g. magnesium sulphate; for those from 15 to 17 years 1½ drops for each year of age, and for adults, 30 drops and afterwards a purgative.

With this procedure the toxic symptoms will be nil, or very mild; moreover, the number of worms expelled will be as great as it would be if the purgative was given 2 hours later.

Ancylostoma duodenale shows a greater resistance than *Necator americanus* to ascaridol.

The same specimen of ascaridol used for a year and four months from the beginning of these experiments has not undergone any change, either of its vermifuge or its toxic qualities. The author regards it as an advantageous substitute for the chenopodic oil in campaigns against ancylostomiasis.

R. T. L.

Shelley (H. M.). **The Treatment of Ankylostomiasis by Glycerine.**—*Kenya Med. Jl.* 1926. Mar. Vol. 2. No. 12. pp. 330–333.

Shelley has used glycerine in 3–5 dram doses preceded the previous evening and followed the next morning by ounce doses of magnesium sulphate, in 22 cases with apparently successful results.

T. W. M. C.

Tsunashima (Y.). Pharmakologische Untersuchungen des vegetativen Nervensystems bei Anchylostomiasis und anderen. [**Pharmacological Investigation of the Visceral Nervous System in Ancylostomiasis and other Conditions.** *Okayama-Igakkai-Zasshi.* 1925. Aug. No. 427. German summary p. 871. [In Japanese.]

The pharmacological action of atropin, adrenalin and pilocarpin on a case suffering from ancylostomiasis has been tested. Of 11 patients with anaemia and eosinophilia to whom adrenalin was administered, only two reacted strongly; one gave an entirely negative result, the others were slightly positive. With pilocarpin there was considerable reaction save in one case. With atropin all reacted, but some to a slighter degree than to pilocarpin. It is concluded that in ancylostomiasis there is an increase in the "labilite" of the parasympathetic nervous system, especially of the vagus. The reaction to atropin increases with the administration of thyroidin as in cases of diabetes and morphinism.

R. T. L.

Joseph (Hugh P.). **Clinical Notes on the Effects of a Nematode Larva in the Eye.**—*Ceylon Jl. Sci.* (Section D. Med. Sci.). 1925. Nov. 18. Vol. 1. Pt. 3. p. 143.

Nicholls (Lucius). **Note on a Nematode Larva removed from the Eye of a Man.**—*Ibid.* p. 145. With 3 figs. on 1 plate.

A Tamil estate labourer was found suffering from an irritable and painful right eye of seven days' duration on admission to the Victoria Memorial Eye Hospital, Colombo. Seven days later a nodular mass was seen on the attached border of the iris and bulging into the anterior chamber at its lower and outer quadrant. Eight days later, a small white worm was seen emerging spontaneously from the mass into the anterior chamber, where it was observed moving freely on the following day. The anterior chamber was incised under cocaine, and the worm removed. Dr. Nicholls gives three microphotos of the worm, which was immature, 11·4 mm. long, unarmed at the mouth and with a cuticle without striation. The oesophagus measured 1·7 mm., the excretory pore 0·22 mm., and the vulvar orifice 0·5 mm. from the anterior end. The posterior end has a terminal spine.

R. T. L.

Kirby Smith (J. L.), Dove (W. E.) & White (G. F.). **Creeping Eruption.**—*Arch. Dermat. & Syph.* 1926. Feb. Vol. 13. No. 2. pp. 137–173. With 17 figs. [33 refs.]

Creeping eruption is a common disease in Florida, and is due there to a microscopical nematode. The eruption is linear, tortuous and serpiginous accompanied by intense itching; sometimes bullae are

formed, and with the drying of the surface of the lesion a thin crust forms. A clinic of ten days was held at Jacksonville, and 179 cases were observed, making a total of 300 seen during the summer of 1924. Pieces of skin removed were sectioned and the larval nematode found therein were submitted to Dr. B. H. Ransom, of the U.S. Bureau of Animal Industry, who gave a guarded opinion that the forms named *Agamonematodum migrans* were third stage larvae resembling larvae of the superfamily of nematodes known as Strongyloides [? Strongyloidea]. At least 50 per cent. of the cases seen by the senior author were traced to the beach and probably originated at points slightly above the high tide water mark. There is a definite seasonal prevalence during the summer months, and mostly following periods of rainy weather. The paper gives details of cases and is illustrated profusely with a very fine series of microphotographs of sections of the worm in tissues, together with representations of the various types and stages of the eruption. Treatment by refrigeration and with ethyl acetate has been successful.

R. T. L.

BERIBERI.

Chun (J. W. H.) & Wu Lien Teh. **Beriberi Control from an Administrative Standpoint.**—*Oriental Jl. Diseases of Infants.* Kyoto. 1926. Jan. Vol. 1. No. 1. English summary pp. 25–35. [37 refs.] [In Japanese.]; and *Nat. Med. Jl. China.* 1926. Feb. Vol. 12. No. 1. pp. 9–20. [Numerous refs. in footnotes.]

While accepting the vitamin theory of beriberi, the authors refer to the various secondary factors, such as deterioration by storage, cooking, etc., and the resolutions passed by the Far Eastern Association of Tropical Medicine are given in full. The measures recommended are "legislative and educational." The provision of undermilled rice by subsidized mills is advised, which rice should be used for public institutions, prisons, asylums, hospitals, road and railway camps, etc. The elimination of beriberi in these would be a convincing demonstration for propaganda purposes. Prohibition of white rice or taxing it is not considered feasible. From an educational point of view the slogan "no overmilled rice no beriberi" is accepted, and with this the importance of care in storing and cooking and the addition of accessory the foods is emphasized. The medical profession must be able to recognize early cases and illustrative pamphlets must be distributed very widely. The people having been educated to recognize the value of the undermilled rice, this must be available. Finally it is necessary to remember that hygienic living as well as proper diet is required.

P. W. Bassett-Smith.

Trabaud. Quelques particularités cliniques et pathogéniques du béri-béri. [**Some Clinical and Pathogenic Peculiarities of Beriberi.**] —*Rev. Méd. et Hyg. Trop.* 1926. Jan.–Feb. Vol. 18. No. 1. pp. 5–12.

The want of properly equipped workers in the endemic areas is, according to the author, the reason why the knowledge of beriberi is so imperfect and contradictory. While he was working in the Levant he was not so handicapped, and he there made a special study of the differential diagnosis between "wet" beriberi and nephritis. It has been stated that the oedema and ascites of beriberi are to be distinguished from those of nephritis by the absence of albumen in the urine; this one factor is not now enough; knowledge of the amount of urea, chlorine, etc., is required as well. Albumen is not uncommon in the urine of beriberi, but *without doubt the quantity is not sufficient to account for the gravity of the symptoms.* In Syria the cases were not at first recognized as beriberi. The author declares that the oedema is not due to nephritis, neither is it of cardiac origin, but to a neurosis of a vasomotor character. The question of an initial fever is debated, since this is an important factor for the theory that beriberi is an infectious disease. The author very rarely observed any fever during the first 3 or 4 days; as a general rule, the temperature curve does not run parallel with the intensity of the symptoms. The early rise in the temperature occasionally seen is considered to be due to elective toxic action upon the peripheral and sympathetic nerves, causing the crises and oedemas. There were six fatal cases, all sudden and unexpected; these were carefully examined and specimens were sent to Val-de-Grace, Paris, for microscope report. No evidence of renal or cardiac degeneration was found. That there is an infection of the vago-sympathetic

system is supported by the pseudo-anginal and visceral crises noted by Solier, Jeanselme and others. The author's physio-pathological researches show that through the lack of certain foods there is a kind of intoxication having a selective action upon parts of the nervous system, the actual clinical conditions depending upon the nerves mostly affected—sympathetic, peripheral, or special as the pneumogastric.

[Most of these deductions were made long ago by Sir Patrick Manson.]

P. W. B-S.

Takano (Rokuro). **Statistical Observation on Beriberi in Japan.**—*Japan Med. World.* 1926. Jan. 15. Vol. 6. No. 1. pp. 8–10.

The author shows that beriberi is not on the decrease in Japan, for the death rate per mille in 1923 was higher than any year since 1914. That of breast-fed infants exceeded all others. It is most common in city dwellers in the hot months. In the army and navy, however, there was very little.

P. W. B-S.

Senga (H.) & Yasutomi (Y.). **On the Basal Metabolism in Beriberi.**—*Jl. Oriental Med.* 1926. Jan. Vol. 4. No. 2. English summary p. 18. [In Japanese.]

It was found that in both cardiac and oedematous forms of beriberi the metabolic rate showed a marked increase during the acute stages, followed by a gradual fall with improvement of the symptoms. In cases of atrophy there was a marked diminution of the basal metabolism.

P. W. B-S.

Tung (C. L.). **Report of a Case of Myxoedema simulating Beriberi.**—*Nat. Med. Jl. China.* 1926. Apr. Vol. 12. No. 2. pp. 142–151. [7 refs.]

The patient, a Chinaman aged 30, was admitted for general weakness and swelling of the face and lower extremities, with a history of 17 years' illness. He had been admitted to or attended various hospitals, and had been treated for beriberi. Both legs were enlarged with pitting on pressure, there was tenderness of the calf and thigh, and the left patellar reflex was obtainable only on reinforcement. Tactile sensation was present but dull. An anti-beriberi régime was begun, but it was soon noticed that the average oral temperature was less than 97° F. and the average pulse rate 64. Administration of thyroid extract gave rise to steady improvement. The author observes:—

"Beriberi can be easily confounded with mild cases of hypothyroidism, if patient only mentions swelling, anaemia, weakness, pain in the muscles of the lower extremities as complaints, if the examiner fails to probe into the details of the history, or if examination has been casual and not discriminating. In our case, these are exactly the pitfalls, especially as there is *real oedema* of the legs, in addition to myxoedematous changes."

Disorders of the thyroid are very rarely met with in East China, whereas beriberi is a common disease.

A. G. B.

Hoffmann (W. H.). El beriberi experimental en los batracios. **Experimental Beriberi in Tadpoles.** *Acad. de Ciencias med. fisicas. y naturales de la Habana.* 1925. Nov. 25. 2 pp.

——. Beriberi bei Froschlarven. *Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Mar. 1. Vol. 30. No. 3. pp. 132–134.

The author carried out feeding experiments with larvae of *Hyla septentrionalis*. He took 60-80 of these and divided them into two groups. One group he fed on mangoes, the other exclusively on bread. The former developed in 14–19 days, the normal period, the latter took 36–62 days. These latter also suffered from paresis passing to definite paralysis of the limbs with atrophy, and shortly before death, which invariably occurred, oedema of the abdominal region. If, however, the food was changed to fruit, insects, or meat, in the earlier stages of the symptoms, amelioration and even cure resulted. The histological changes are not yet completely examined, but the author regards the condition as being similar to, perhaps identical with, human beriberi, which is therefore probably a form of avitaminosis and not of infective origin. As these animals are easy to deal with he suggests their employment for experiment in this direction. Mangoes might be good treatment for human beriberi.

H. Harold Scott.

Farnum (Martha B.). **Gastric Secretion in Experimental Beriberi in the Dog.**—*Arch. Intern. Med.* 1926. Feb. 15. Vol. 37. No. 2. pp. 212–216.

It is stated that in a number of cases of beriberi observed clinically a diminution of the gastric secretion has been noted. Experiments on dogs, which were fed upon a beriberi-producing diet, showed not only a decreased acidity but diminished secretion of the gastric juice. In the author's experiments "Pawlow pouch dogs" were used; in these it took 31-35 days to produce severe symptoms of beriberi, but the lowered acidity and decreased secretion of gastric juice was observed several weeks before. The author showed, also, that the alkali (sod. carb.), added in the autoclaving process of the food, destroys the anti-neuritic vitamin, and that this vitamin does not itself stimulate gastric secretion. In cases of severe beriberi in dogs injections of histamine-hydrochloride had 1½ to 3 times less stimulating effect upon the gastric secretory mechanism than in healthy animals, and injections of gastrin had still less action. Many tables are given illustrating these points.

P. W. B-S.

Horvath (A. A.). **Soy Sauce as a Stimulative Agent in the Development of Beriberi in Pigeons.** *Proc. Soc. Experim. Biol. & Med.* 1926. Apr. Vol. 23. No. 7. pp. 616–617. and in *Nat. Med. Jl. China.* 1926. Apr. Vol. 12. No. 2. pp. 176–177.

Various experiments have shown that beriberi in pigeons may be produced by some toxin absorbed from the intestinal tract. Soy sauce may, besides stimulating digestion and absorption, stimulate the production and absorption of the toxic substance. Seven pigeons were examined to determine if this was the case or not; within a month

five of those which received soy sauce developed beriberi, whereas the five controls escaped. In one case death occurred on the sixth day with symptoms of acute intoxication. From these experiments [which are few, the author concludes that soy sauce does in pigeons stimulate the onset of beriberi.

P. W. B-S.

MONTES (José E.) La pleuresia beribérica.—*Los Progresos de la Clin.* Madrid. 1924. May. Year 12. No. 149. Vol. 27. No. 5. pp. 577–593. With 5 text figs. [2 refs.]

OHATA (Tomosaburō), KAŬAKITA (Ŝintarō), SUZUKI (Susumu) & KAGOŜIMA (Ŝigeru). Pri la rizmalsano de birdoj (dua raporto). Precipe pri la rizmalsano kaŭzita per nutraĵo rilate manka je vitamino-B.—*Mitt. a. d. Med. Fak. d. Kais. Univ. Tokyo.* 1925. Vol 32. No. 3. pp. 431–560. With 8 charts in text. [22 refs.]

——, ——, —— & ——. Pri la kvanto de vitamino B rezervita en organoj ĉe beribero kaj la komparo kun tiu ĉe malsano pre manko de vitamino B (rizmalsano).—*Mitt. a. d. Med. Fak. d. Kais. Univ. Tokyo.* 1925. Vol. 32. No. 3. pp. 561–604.

SCURVY.

Alalou (M.). Remarques à propos d'une épidémie de stomatites ulcéromembraneuses et scorbutiques. [**An Epidemic of Ulcero-Membranous and Scorbutic Stomatitis.**] *Bull. Soc. Path. Exot.* 1926. Jan. 13. Vol. 19. No. 1. pp. 5–6.

In the Mossul area a dozen cases of stomatitis were observed among 14,000 men. In some the ulceration was scorbutic, in others there was a mixed infection. The gums were most often affected; the ulcers may be covered by false membrane, and are painful, but rarely phagadenic. The organism of Vincent's angina is frequent, and the teeth become loosened. Keratosis of the skin of the lower limbs is also found. It is noted that the condition was seen mostly in men debilitated during the war whose diet had been insufficient. Iodine, permanganate, chlorate of potash and neosalvarsan gave unsatisfactory results, but local applications of chromic acid crystals were effective.

P. W. Bassett-Smith.

Djémil (Said). Kératoses pilaires préscorbutiques. [**Prescorbutic Keratosis Pilaris.**] *Bull. Soc. Path. Exot.* 1926. Jan. 13. Vol. 19. No. 1. pp. 6–8. [2 refs.]

The author draws attention to this condition of the skin as an early indication of a scorbutic state when it is associated with anaemia, lassitude and rheumatic pains. It is most commonly seen in the lower limbs; the thickened points may be grey or red and may be followed by petechial spots but are rarely associated with typical haemorrhages or gingivitis. The follicular thickening has been frequently referred to by Le Dantec, De la Mere and others in the Macedonian area during the war, and these observations are here confirmed in Greeks evacuated from Anatolia.

P. W. B-S.

Holst (Axel) & Fellschner (Wilhelm). Ein Beitrag zur Frage der Konservierung antiskorbutischer Nahrungsmittel. [**The Preservation of Antiscorbutic Foods.**] *Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1925. Vol. 29. No. 1. pp. 163–168. [3 refs.]

In continuation of previous work an endeavour was made to find better means of preserving the antiscorbutic value of vegetable foods for the mercantile marine. In these experiments the tests were restricted to drying cabbage without destroying the vitamin C.

Drying by desiccation, drying and briquetting with sugar, were unsuccessful as the antiscorbutic value was quite lost in a year. Continuous drying was also ineffective. Chemical methods with P_2O_5 gave very good results but were impracticable on account of expense. Formaldehyde preserved the cabbage for 9–10 months at 37° C. without the necessity of complete drying, which points to the conclusion that the change in the antiscorbutic vitamin is due to an enzyme, but formalin has the disadvantage that, though it may not change the colour and taste of the substance, it can be detected chemically and would render the food bad for health. Further experiments are being conducted to destroy the enzyme without injuring the food. It is

probable that the same method will not be applicable to all foods, and we do not even know that the vitamin is in all foods the same, thus dandelions lose their activity after a week's drying at 37° C., while cabbage does not.

P. W. B.-S.

Reyher. Zur Frage des Gehaltes der Frauen und Kuhmilch an antiskorbutischen Stoffen. (Zugleich ein Beitrag zur Säuglingsmilchfrage.) [**The Content of Human and Cow's Milk in Antiscorbutic Substances.**]—*Arch. f. Kinderheilk.* 1926. Vol. 77. No. 3. pp. 161–194. With 4 figs. and 16 curves. [9 refs.]

This is a very long and argumentative paper discussing much by Frolich, Meyer & Nasau, Franks, Schmidt and others that has already been reviewed here. The results of experiments are very fully put forward with tables, charts, radiograms, etc., which demonstrate the following points: Eleven guineapigs of about 250 gms. fed upon oats and 20–30 gms. of human milk given daily, *by means of a pipette*, never showed any sign or symptom of scurvy; the animals died from inanition, probably due to lack of albumen and salts, for the diet contained a sufficiency of antiscorbutic substances. Cow's milk obtained from farms near Berlin and infant clinics, winter and summer milk, boiled and unboiled, fresh and dry, under various conditions were tested on 26 guineapigs. The author is in complete agreement with Meyer & Nasau as to the value of guineapigs in testing the antiscorbutic properties of milk for use in clinics, for often, when no symptoms are present, radiograms showed histological evidence of scurvy. He emphasizes the importance of recognizing the variability of the vitamin content in cow's milk according to the feeding of the animals, whether in winter or summer, etc. For experimental and clinical work the original vitamin content should be estimated, and this is specially important when preparing dried milk. In his opinion, boiling for two minutes distinctly reduces the antiscorbutic value of cow's milk. For infant's milk, the cows must be free from tubercle, in good condition, and well fed with regular and sufficient green fodder summer and winter, rich in vitamin C; the milk should be used raw. He pessimistically says that the problem of getting really good milk for children in Berlin has made no real progress, and the provision of winter milk is still less satisfactory.

P. W. B-S.

Wolbach (S. Burt) & Howe (Percy R.). **Intercellular Substances in Experimental Scorbutus.**—*Arch. of Path. & Lab. Med.* Chicago. 1926. Jan. Vol. 1. No. 1. pp. 1–24. With 16 figs. [3 refs.]

This report gives the results of careful work and study to determine the pathological characters found in scurvy. It is pointed out that Aschoff & Koch, and Höjer found very similar histological changes, but that whereas Höjer ascribed the deficient bone formation to a degeneration of the bone forming cells, these being so changed that in time their activity entirely fails, the former find that the cessation of new bone formation and rarefaction of existing bone, with irregularities and absorption of cartilage columns, leads to a zone of fragmentation adjacent to the line of junction with the cartilage; the osteoblasts assume elongated shapes and apparently disappear from regions; the

zone becomes filled with loose textured connective tissue structure described as oedematous or gelatinous. The osteoblasts fail to form osteoid tissue because of a want of essential materials and the authors postulate a failure of cementing substance in the blood vessels, thus accounting for the haemorrhages.

The work of the authors was carried out on guineapigs in a state of absolute scurvy and during early repair, following the administration of antiscorbutics, noting changes in the incisor teeth, changes in the bones, changes in the repair of soft tissues, and in the repair of bone injuries. The results corroborate and extend the deductions of Ascroft & Koch, so that the authors characterize the scorbutic state as one due to the inability of supporting tissues to produce intracellular substances and to maintain existing intracellular substances. They finally advance the theory that the failure of cells to produce intracellular substance in scurvy is due to the absence of an agent common to all supporting tissues which is responsible for the setting or jelling of a liquid product; the osteoporosis suggests further the hypothesis that the reaction is in some way a reversible one.

The details of the work are fully given, and beautiful illustrations of the various conditions found are inserted. For fuller information the original paper should be carefully read.

P. W. B-S.

Medes (Grace). **Germinal Epithelium of Guinea Pigs during Early Stages of Scurvy.**—*Proc. Soc. Experim. Biol. & Med.* 1926. Jan. Vol. 23. No. 4. p. 294.

Guineapigs on a scorbutic diet *plus* whole powdered milk though showing no signs of scurvy when histologically examined gave evidences of definite changes. In the testes engorgement and degeneration of the seminal epithelium of some of the tubes was seen. Guineapigs kept for 30–40 days in a state of chronic scurvy show almost complete recovery of the germinal epithelium after 17 days on anti-scurvy diet.

P. W. B-S.

Wallington (K.T.K.) A Case of Arthritis and Stomatitis: possibly Scurvy.—*Kenya. Med. Jl.* 1925. Apr. Vol. 2. No. 1. pp. 25–26.

REVIEWS AND NOTICES.

CRAIG (Charles F.). [M.D., M.A. (Hon.), Lt.-Col., Med. Corps, U.S. Army, D.S.M., etc.] **A Manual of the Parasitic Protozoa of Man.** —pp. viii+569. With 95 text figs. 1926. Philadelphia & London: J. B. Lippincott Company. [Price 35s.]

The author explains in his preface that during a study of parasitic Protozoa extending over nearly thirty years, ten of which have been devoted to teaching, he has on many occasions felt the need of a manual in English which would adequately cover the field from the point of view of the medical man. To meet this need, which must have been realized by many who have been engaged in teaching the subject, the volume under review has been produced. It contains eighteen chapters and a technical appendix followed by an authors' and a general index. It is claimed that the book contains every known fact of real importance about the various parasites described and a perusal of the pages shows that this claim is amply justified. One chapter is devoted to a general consideration of the Protozoa, their classification, structure, physiology, reproduction and parasitism. Four chapters deal with parasitic and coprozoic amœbae, two with the parasitic and coprozoic flagellates of the intestine and their allies in other situations, four with the blood and tissue flagellates, one with the coccidia, four with the parasites of malaria, one with the sarcosporidia and one with the ciliates. Each organism is described under the following headings: Synonyms, History and Nomenclature, Morphology in Living and Stained Preparations, Resistance to Injurious Agencies, Habitat, Species Occurring in Lower Animals, Cultivation, Life-histories, Method of Reproduction, Geographical Distribution, Incidence of Infection, Method of Transmission, Experimental Infection of Lower Animals, Relation to Disease, Pathology, Prophylaxis and Diagnosis.

The information regarding the well-established parasitic Protozoa of man is accurate and exhaustive and, with certain reservations to be noted below, the student cannot go far wrong in accepting the book as a reliable guide to the subject. It is of convenient size and of durable materials. The print is good, while the matter is set out clearly under conspicuous headings. In most cases the illustrations are satisfactory, but some of the photomicrographs, particularly those illustrating the amœbae and malarial parasites, are not as clear as they should be. However useful photomicrographs may be for certain purposes they are of very doubtful value in a students' text book. It is the reviewer's opinion that a series of black and white drawings, even if of a diagrammatic type, would have been of much greater value in showing details of structure which are necessary for the student's instruction.

It is inevitable that certain discrepancies and errors of a minor nature should have crept in, while in certain cases it is the reviewer's opinion that the author has erred in adopting views which cannot be supported by the evidence and which are at variance with those of the majority of protozoologists. For instance, he is convinced of the existence of *Craigia hominis*, *Plasmodium falciparum* var. *quotidianum*, *Plasmodium vivax* var. *minutum* and *Plasmodium tenue*, and though it is frankly admitted that his opinions are not shared by others it is a pity, from the point of view of the student, that so much prominence has been given to them. Though statements such as these detract little from the general value of the book it will perhaps be useful to discuss them.

In the classification of the amœbae, the author adopts the genus *Endamœba* and states that in his opinion there are three sub-genera, viz., *Endamœba* for the form in the cockroach, *Poneramœba* for the two common amœbae of man and *Endolimax* for *E. nana*. Nevertheless, he

makes the somewhat paradoxical statement that owing to limited knowledge the sub-generic names should not be employed. On p. 220 the name *Bodo salivarius* is given to the flagellate seen by KNOWLES and DAS GUPTA in the mouth of a patient in Calcutta, though no evidence is produced that it is distinct from one or other of the well-known free-living forms. On p. 226 the definition of the kinetonucleus is involved. If any part of this structure is a blepharoplast it is certainly the basal granule, while the name rhizoplast is usually applied to the filament which connects the basal granule with the base of the flagellum on the surface of the body. It is certainly incorrect to apply the term blepharoplast to the deeply staining body which is connected in some way with the basal granule. The statements on p. 229 regarding the method of division of the kinetonucleus are of very doubtful value, while the process of schizogony of trypanosomes described on the same page, especially as regards the behaviour of the nucleus, is quite incomprehensible. It is highly improbable that such a process occurs.

Again, on p. 280, the reproduction of the leishmania forms of *Trypanosoma cruzi* is said to take place by schizogony as claimed by HARTMANN, but no mention is made of the fact that the usual and generally accepted method of reproduction is by binary fission. In the description of the supposed latent bodies of trypanosomes on p. 242, the author states that in his belief the evidence is quite conclusive that they are vitally concerned in the life-cycle of the trypanosome in man. It is the reviewer's opinion that there is no reliable evidence that this is the case. In discussing the relationship of *Trypanosoma rhodesiense* to *Trypanosoma brucei* (p. 264), the experiments of TAUTE and HUBER, who inoculated 131 human beings with animal strains of *T. brucei* without producing a single infection, are quoted as being evidence amply sufficient to prove that the two trypanosomes are distinct. To believe that 131 men could be naturally immune seems to the author "almost too much of a strain on one's credulity." He says that there is no parallel instance in our knowledge of immunity. It may be noted, however, that WATSON (1920) in attempting to isolate *Trypanosoma equiperdum* from horses in Canada succeeded in infecting a white mouse after hundreds of unsuccessful attempts with dogs, rabbits, guineapigs, rats and mice. When once established in the mouse the strain readily infected the other animals. It does not seem impossible to the reviewer that there may be a similar difficulty in *T. brucei* establishing itself in man, but that once established it is readily inoculable from man to man as *T. rhodesiense*. In connexion with *Trypanosoma cruzi* (p. 287), for which the author retains the generic name *Schizotrypanum*, mention is made of the fact that YORKE proposed the name *Trypanosoma escomeli* for a form described by ESCOMEL which resembled *T. cruzi*, but was distinctly larger. It is not mentioned that ESCOMEL subsequently redescribed the trypanosome and admitted that his previous measurements were incorrect and that the organism was actually *T. cruzi*.

On p. 342, in connexion with the transmission of South American leishmaniasis, no mention is made of the experiments of ARAGÃO, who produced sores in a dog by inoculating crushed up Phlebotomus which had previously been allowed to feed on cutaneous lesions. On p. 333 it is stated that PATTON found flagellates in *P. papatasii* in Macedonia. The locality should have been Mesopotamia, but actually PATTON never found flagellates in these flies, his statements being purely conjectural, as he has informed the reviewer. With reference to the coccidia, it is hardly correct to say (p. 348) that until DOBELL'S revision in 1919 the classification was in a chaotic state. The classification of these organisms was well understood before this, DOBELL merely showing that many supposed coccidia of man were not of this nature. It is unfortunate that the discovery by THOMSON and ROBERTSON that the supposed eimerias of man were merely those of fish passing through the intestine was made too late for notice in the volume. Under *Isospora hominis* (the form

which the reviewer has named *I. belli*) it is stated (p. 352) that there is no evidence of its pathogenicity, the case of a laboratory infection resulting in definite symptoms described by Connal having evidently been overlooked.

On the question of malaria the author holds certain opinions of his own. Though he discards the view that relapses are due to parthenogenesis of female gametocytes, he introduces a theory which seems equally improbable to the reviewer (p. 369). He believes that resistant forms are produced by conjugation in the blood of man and that when fully formed they resemble gametocytes. The reviewer admits the possibility of two asexual forms within a red cell fusing as regards their cytoplasm, though he himself has failed entirely to see such a process in the living organism. Such a fusion, however, is not necessarily a conjugation, and before it can be regarded as such, very substantial evidence would have to be produced. Similarly, on p. 95, the author states that he has observed in *Entamoeba gingivalis* a process which he believes to be one of conjugation. He takes objection to the statement made by Dobell (1919) that he did not describe the process and quotes his own words written in 1916. Though he may have observed the fusion of two amoebae and their ultimate separation after interchange of cytoplasmic substance and ingested bodies, this is a very different thing from conjugation which cannot be regarded as having taken place unless a fusion of nuclei has occurred. As regards *P. falciparum* var. *quotidianum*, the author believes that this parasite is distinct from *P. falciparum* chiefly because it causes a quotidian fever, is definitely smaller in all its stages of development, and gives rise to fewer merozoites (p. 452 *et seq.*). The experiments on inoculated malaria in the treatment of general paralysis have shown that infection produced by a single mosquito bite may give rise in the case of *P. vivax* to quotidian fever, so that this feature loses some of its importance as a means of differentiating species. Whether the small size and smaller merozoite number indicate a distinct parasite or merely a small strain of *P. falciparum*, which in the reviewer's experience varies much in size in different infections, can only be decided by further and most difficult observation. The reviewer is of opinion that it is better to regard all the crescent producing parasites of man as belonging to the one species *P. falciparum*. Similarly, he thinks it better to regard *P. minutum* (*P. ovale*) as an aberrant form of *P. vivax* and *P. tenue* as an amoeboid form of *P. falciparum* rather than as distinct species (pp. 462–470). It should be pointed out that Laveran and Marullaz (1914) gave the name *Haemamoeba tenuis* to a small species of *Plasmodium* of birds and as *Haemamoeba* is a synonym of *Plasmodium* it is very doubtful if the name *Plasmodium tenue* can legitimately be employed for the human parasite even if it be a distinct species. As regards the bird parasite, the author on p. 390 states that it belongs to the genus *Proteosoma*. The majority of protozoologists, including the reviewer, believe that it has no characters to justify its inclusion in any other genus than *Plasmodium*. In the section devoted to the ciliates (p. 518) it is erroneously stated that these Protozoa reproduce by binary longitudinal division, though on p. 524 *Balantidium coli* is correctly described as dividing by transverse division.

On the genus *Craigia*, the author is most emphatic. The form *C. hominis*, first described by him from the Philippine Islands, is said to have an amoeboid phase which eventually encysts. Within the cyst numerous flagellates, each with a single flagellum, are produced. They escape from the cyst and become amoebae, which after growth repeat the encystment process. No one, apart from the author, has yet been able to discover in the human intestine an organism which has such a life cycle and the reviewer, who has fully discussed the question elsewhere, and many other observers deny that any such organism exists. The discovery by Kofoid of an amoeboid organism with a single very fine flagellum in human faeces does not support the author's contentions, for no life cycle like that attributed to members of the genus *Craigia* has been traced,

Kofoid's organism probably belongs to the genus *Oikomonas* or one of its allies and does not resemble in any way the flagellate form of *C. hominis* depicted by the author, which has a thick tail rather than a flagellum. The reviewer has pointed out that it is his belief that the flagellate stage of *C. hominis* first described by the author from the Philippines and later recorded from Honduras by Barlow is merely *Chilomastix mesnili*, for the author failed to recognize this species in the Philippines, while Barlow did not record it from Honduras, in both of which places it is now known to be of frequent occurrence.

It is unfortunate that in the list of members of the genus *Plasmodium* occurring in animals (p. 389) *P. bovis* Kolle, 1898, is mentioned, for it is far from clear that Kolle was dealing with a member of this genus, while the undoubted species *Plasmodium bubalis* which occurs in the buffalo in India in not noted.

A reviewer naturally turns to references to his own work. In this case he finds that the author has made very generous references to his publications, but in two instances these are inaccurate. On p. 170 it is stated that he described *Trichomonas* in the wall of the human small intestine instead of the large intestine, while on p. 128 it is stated that he mistook *Blastocystis* for the cysts of *Chilomastix mesnili*. A reference to the reviewer's paper of 1910, in which this flagellate was first described, will show that the cysts of *C. mesnili* were properly described and depicted and that the reference to *Blastocystis* concerns certain degenerate flagellates which resembled this organism.

Such are some of the points on which the reviewer finds himself in disagreement with the author in a book which is full of information and instructive detail. The student of medical protozoology is fortunate in having available such a clear account of the Protozoa which produce disease in man.

C. M. Wenyon.

Engel-Bey (Fr.). [Prof. Dr. Geheimer Sanitätsrat.] Zur Therapie der Lepra. [**Treatment of Leprosy.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg. Path. u. Therap. Exot. Krankh.* 1926. Vol. 30. No. 2. 60 pp. 1926. Leipzig: Verlag von Johann Ambrosius Barth. [Price Rm. 3.]

Dr. Engel-Bey deals in this paper with the results obtained in recent years by the modern treatment of leprosy with the derivatives of chaulmoogra oil.

Up to the end of the last century the outlook for the leper was generally regarded as an almost hopeless one. It was known that cases sometimes occur in which the disease appears to exhaust itself and a spontaneous cure follows; but such cases are exceptional, and the causes of such a fortunate result are unknown.

In the absence of any specific treatment for the disease, recourse was had to numerous drugs and other substances, some of which had a considerable vogue for a time; nearly all of them have failed to justify the optimistic expectations that were sometimes entertained.

At all times chaulmoogra oil has enjoyed a good repute, especially in India. But the crude oil, when given by the mouth, is so unpleasant and so liable to cause digestive and other disturbances, and injections of it are so painful and so slowly absorbed, that patients can seldom be induced to continue the treatment for an adequate length of time. During the last twenty years or so many medical men and chemists, in several parts of the world, have carried out investigations into the composition of chaulmoogra oil, and have succeeded in isolating, in a more or less pure state, those constituents (chiefly unsaturated fatty acids) that have the greatest therapeutic and the least irritating effect. Dr. Engel-Bey gives here a very interesting though brief account of the chief work that has been done

in this direction, and of the results that have been obtained by numerous physicians in charge of leper asylums. Almost all have reported favourably —many, indeed, very enthusiastically—of the striking effects of the new chaulmoogra derivatives. He contrasts the attitude towards the curability of leprosy of those attending the Second Leprosy Congress in 1909 with that of the members of the Third Congress in 1923; and it is obvious that most of those who have had experience of the results of modern treatment feel justified in taking a much more sanguine view of the situation than was formerly possible. The author makes no extravagant claims for this treatment; too little time has elapsed since it has been adopted on a large scale for a decided opinion about it. It is certain that there are many cases that cannot be cured at present, though there are few in which the condition cannot be, at least, much ameliorated. He emphasizes, as others have done, the fact that in leprosy (as in tuberculosis, syphilis and cancer) early diagnosis and treatment are of the first importance.

The problem for the immediate future is how to educate the inhabitants of countries where leprosy is common, and bring home to the them the knowledge that leprosy can be cured if early recourse is had to treatment. A favourable circumstance is that most people in those countries are quite familiar with the common early symptoms of leprosy. Fortunately, also, the administration of the chaulmoogra-esters is practically painless, and this cannot fail to popularize modern treatment. Dr. Engel-Bey insists on the importance of carrying out the treatment in asylums or hospitals, where good food, good nursing, and a hygienic environment contribute so much to success. He reminds us that ignorant people are always apt to imagine that they are cured as soon as they obtain some relief from urgent and obvious symptoms; unless they are happy and comfortable, they will not stay for the prolonged course of treatment that is necessary for a complete cure.

Although, with the exception of some recent reports and statistics, there is nothing absolutely new in Dr. Engel-Bey's paper, his lucid summary of the actual facts of the present state of the treatment of leprosy is of much practical value.

H. J. Walton.

Blanton (Wyndham B.) [B.A., M.A., M.D., Richmond, Virginia. Associate in Medicine, Med. College of Virginia.] **A Manual of Normal Physical Signs.**—215 pp. 1926. St. Louis: The C. V. Mosby Company. [$2.50.]

The preface of this book suggests that the text-books of Physical Diagnosis are so complicated by descriptions of pathological signs that the average beginner cannot disentangle the normal signs. This "compilation of normal findings"—without illustrations!—claims to simplify the study of the normal and does not justify the claim. The chapter on blood pressure is positively misleading: the systolic blood pressure is stated to be "a measure of the force of the heart beat," and it is surprising to find the unqualified statement that the blood pressure rises in the evening. A new book is always welcome when it throws light on new work or new light on old work, but the subject material of the book under review is, and for years has been, better and more lucidly arranged in better books.

R. J. C. Thompson.